Study	Endpoint	Category	Notes from consult
28-day Mice	Cumulative body weight change	2	Difficult to interpret from a human health tox perspective, not necessarily "adverse"; does inform us not to rely on absolute organ weights or organ wt: body wt ratio
28-day Mice	Erythrocyte count	1	Small changes in hematology may not be adverse, but can be modeled to demonstrate consistent trend both within and among studies
28-day Mice	Hemoglobin	1	Small changes in hematology may not be adverse, but can be modeled to demonstrate consistent trend both within and among studies
28-day Mice	Hematocrit	1	Small changes in hematology may not be adverse, but can be modeled to demonstrate consistent trend both within and among studies
28-day Mice	Differential Leukocyte counts	3	Wouldn't recommend differential leukocyte counts, they are less common white blood cells. If this endpoint is used, use absolute values not %
28-day Mice	Albumin	2	A/G ratio will be more sensitive
28-day Mice	Total Protein	2	Trend unclear, change minor
28-day Mice	Globulin	2	A/G ratio will be more sensitive
28-day Mice	Albumin/Globulin ratio	1	Model males and females
28-day Mice	Urea nitrogen	3	Creatine was normal, not a lot of corresponding renal effects; this measure can reflect protein intake and water intake, so not necessarily directly reflective of test substance related effects
28-day Mice	Alkaline Phosphatase	1	Model males and females; liver enzymes; alk phos is cytosolic so is "leaky" during necrosis
28-day Mice	Alanine Aminotransferase	1	
28-day Mice	Aspartate aminotransferase	1	
28-day Mice	Chloride	2	Electrolytes rarely used as critical endpoint

28-day Mice	Sorbitol dehydrogenase	1	Model males and females; alk phos likely more sensitive (leakier), but include this endpoint as a marker of liver effects
28-day Mice	Enlarged liver	2	Confirms liver effects; liver weight more sensitive endpoint
28-day Mice	Adrenal gland weight to brain weight	1	Do not model absolute organ weights or organ weight:body weight
28-day Mice	Adrenal gland weight absolute	3	May be affected by changes in overall body weight
28-day Mice	Adrenal gland weight to body weight	3	May be affected by changes in overall body weight
28-day Mice	Liver weight absolute	3	May be affected by changes in overall body weight
28-day Mice	Liver weight to body weight	3	May be affected by changes in overall body weight
28-day Mice	Liver weight to brain weight	1	
28-day Mice	Kidney weight absolute	3	May be affected by changes in overall body weight
28-day Mice	Kidney weight to body weight	3	May be affected by changes in overall body weight
28-day Mice	Kidney weight to brain weight	1	
28-day Mice	Uterus weight	3	Decrease not necessarily relevant to hormone disruptions
28-day Mice	Uterus weight to final body weight	3	May be affected by changes in overall body weight
28-day Mice	Uterus weight to brain weight	2	Clinical relevance?; Decrease not necessarily relevant to hormone disruptions
28-day Mice	Adrenal cortical hypertrophy	2	Corresponds to changes in adrenal weights, but unlikely to lead to lower BMDL
28-day Mice	Hepatocellular hypertrophy	1	Model male and female
28-day Mice	Liver, increased mitoses	2	"fuzzy endpoint" may not account for other factors that would alter this number
28-day Mice	Liver necrosis, single cell	1	
28-day Mice	Diestrus stage of the estrus cycle	3	Uncertainty in measurements
28-day Rats	Erythrocyte count	1	Small changes in hematology may not be adverse, but can be modeled to demonstrate consistent trend both within and among studies
28-day Rats	Hemoglobin	1	Small changes in hematology may not be adverse, but can be modeled to demonstrate consistent trend both within and among studies
28-day Rats	Hematocrit	1	Small changes in hematology may not be adverse, but can be modeled to demonstrate consistent trend both within and among studies

28-day Rats	Reticulocyte	1	Less sensitive than other hematology endpoints, but further evidence of effects on red blood cell production
28-day Rats	Albumin	2	A/G ratio will be more sensitive
28-day Rats	Globulin	2	A/G ratio will be more sensitive
28-day Rats	Albumin/Globulin ratio	1	
28-day Rats	Urea nitrogen	3	
28-day Rats	Glucose	2	
28-day Rats	Cholesterol	1	May be associated with decreased liver function
28-day Rats	Sorbitol dehydrogenase	1	Modeled for mice study
28-day Rats	Kidney weight absolute	3	May be affected by changes in overall body weight
28-day Rats	Kidney weight to body weight	3	May be affected by changes in overall body weight
28-day Rats	Kidney weight to brain weight	1	
28-day Rats	Liver weight absolute	3	May be affected by changes in overall body weight
28-day Rats	Liver weight to body weight	3	May be affected by changes in overall body weight
28-day Rats	Liver weight to brain weight	1	
28-day Rats	Hepatocellular hypertrophy	1	Males more sensitive
28-day Rats	Hepatocellular necrosis	1	
90-day Mice	Final body weight	1	
90-day Mice	Overall body weight gain	3	Final body weight is a better endpoint (assuming that initial groups were randomized by initial body weight)
90-day Mice	Overall daily food consumption	3	Subject to experimental error and difficult to accurately quantify
90-day Mice	Overall daily food efficiency	3	Subject to experimental error and difficult to accurately quantify
90-day Mice	Mean corpuscular (cell) [hemoglobin]	3	Hematology endpoints from 28 day study better option
90-day Mice	Platelet count	1	
90-day Mice	Aspartate aminotransferase	1	
90-day Mice	Alanine Aminotransferase	1	Model males and females
90-day Mice	Sorbitol dehydrogenase	1	Model males and females
90-day Mice	Alkaline Phosphatase	1	Model males and females
90-day Mice	Bilirubin	2	Change is very minor
90-day Mice	Cholesterol	1	May be associated with decreased liver function
90-day Mice	Total Protein	2	

90-day Mice	Albumin	2	A/G ratio will be more sensitive
90-day Mice	Potassium	2	Electrolytes rarely used as critical endpoint
90-day Mice	Chloride	2	Electrolytes rarely used as critical endpoint
90-day Mice	Total Bile Acids	2	
90-day Mice	Liver weight absolute	3	May be affected by changes in overall body weight
90-day Mice	Brain weight to final body weight	3	May be affected by changes in overall body weight
90-day Mice	Epididymites weight to final body weight	3	May be affected by changes in overall body weight
90-day Mice	Liver weight to final body weight	3	May be affected by changes in overall body weight
90-day Mice	Spleen weight to final body weight	3	May be affected by changes in overall body weight
90-day Mice	Heart weight to brain weight	2	Endpoint not seen in other studies, trend unclear
90-day Mice	Kidney weight to brain weight	1	
90-day Mice	Liver weight to brain weight	1	Model males and females
90-day Mice	Spleen weight to brain weight	2	Marked secondary because only seen in females; spleen in rodents is associated with hematopoiesis
90-day Mice	Liver discoloration	3	"fuzzy endpoint" may be hard to quantify
90-day Mice	Enlarged liver	3	Use liver weight
90-day Mice	Kidney hypertrophy tubular epithelium	2	Minimal effects, and limited other data showing renal effects
90-day Mice	Hepatocellular hypertrophy	1	Males more sensitive
90-day Mice	Liver, mitotic figures	2	"fuzzy endpoint" may not account for other factors that would alter this number
90-day Mice	Liver pigment increased, Kupffer cells	3	Only mention of Kupffer cells
90-day Mice	Single cell necrosis, hepatocellular	1	
90-day Rats	Overall food consumption	3	Subject to experimental error and difficult to accurately quantify
90-day Rats	Erythrocyte count	1	Males more sensitive
90-day Rats	Hemoglobin	1	Males more sensitive
90-day Rats	Hematocrit	1	Males more sensitive
90-day Rats	Mean corpuscular volume	3	
90-day Rats	Mean corpuscular hemoglobin	3	
90-day Rats	Mean corpuscular [hemoglobin]	3	
90-day Rats	Platelets	1	Males more sensitive; modeled in previous study
90-day Rats	Reticulocyte (%)	3	Absolute measurement better endpoint
90-day Rats	Reticulocyte absolute	1	Males more sensitive

90-day Rats	Basophil (%)	3	Absolute measurement better endpoint
90-day Rats	Basophil absolute	2	
90-day Rats	Albumin	2	A/G ratio will be more sensitive
90-day Rats	Total protein	2	
90-day Rats	Globulin	2	A/G ratio will be more sensitive
90-day Rats	Albumin/Globulin ratio	1	
90-day Rats	Total bilirubin	2	
90-day Rats	Urea nitrogen	3	
90-day Rats	Alkaline Phosphatase	1	Males more sensitive
90-day Rats	Gamma glutamyltransferase	2	
90-day Rats	Cholesterol	2	1 in other studies but marked 2 here - less sensitive than other endpoints in this study
90-day Rats	Phosphorus	2	Electrolytes rarely used as critical endpoint
90-day Rats	Urine pH	3	
90-day Rats	Urine total volume	3	
90-day Rats	Kidney weight absolute	3	May be affected by changes in overall body weight
90-day Rats	Kidney weight to body weight	3	May be affected by changes in overall body weight
90-day Rats	Kidney weight to brain weight	1	Males more sensitive
90-day Rats	Liver weight absolute	3	May be affected by changes in overall body weight
90-day Rats	Liver weight to body weight	3	May be affected by changes in overall body weight
90-day Rats	Liver weight to brain weight	1	
90-day Rats	Hepatocellular hypertrophy	1	Males more sensitive
2-year Rats	Erythrocytes - 3 month	1	Males more sensitive; Note that this effect (and other hematology endpoints) are transient and disappear by 12 months except in highest female dose group (500 mg/kg/day)
2-year Rats	Hemoglobin - 3 month	1	Males more sensitive; Note that this effect (and other hematology endpoints) are transient and disappear by 12 months except in highest female dose group (500 mg/kg/day)
2-year Rats	Hematocrit - 3 month	1	Males more sensitive; Note that this effect (and other hematology endpoints) are transient and disappear by 12 months except in highest female dose group (500 mg/kg/day)
2-year Rats	Mean corpuscular volume	2	
2-year Rats	Mean corpuscular [hemoglobin]	2	

2-year Rats	Activated Partial Thromboplastin Time	3	Not a sensitive endpoint
2-year Rats	Potassium	2	Electrolytes rarely used as critical endpoint
2-year Rats	Chloride	2	Electrolytes rarely used as critical endpoint
2-year Rats	Phosphorus	2	Electrolytes rarely used as critical endpoint
2-year Rats	Alkaline Phosphatase - 3 months	1	
2-year Rats	Alkaline Phosphatase - 12 months	1	
2-year Rats	Total bilirubin	2	
2-year Rats	Gamma glutamyltransferase	2	
2-year Rats	Alanine Aminotransferase - 12 months	1	
2-year Rats	Alanine Aminotransferase - 6 months	2	12 months more sensitive
2-year Rats	Sorbitol dehydrogenase - 12 months	1	
2-year Rats	Urea nitrogen	3	
2-year Rats	Total protein	2	
2-year Rats	Albumin	2	A/G ratio will be more sensitive
2-year Rats	Globulin	2	A/G ratio will be more sensitive
2-year Rats	Albumin/Globulin ratio	1	12-month timepoint to start with
2-year Rats	Cholesterol	2	Not a sensitive endpoint
2-year Rats	Urine volume	3	
2-year Rats	Urine specific gravity	3	
2-year Rats	Urine pH	3	
2-year Rats	Organ weights	2	Not a sensitive endpoint; brain wt to BW - interim; kidney to BW - interim; kidney (abs, to BW) - terminal; liver (abs, to BW, to BrW) - interim and terminal; Spleen (abs, to BrW) - interim; thyroid/parathyroid to BW - interim

2-year Rats	Other microscopic Findings	3	Some microscopic findings were not chosen as primary endpoints for modeling due to the availability of more sensitive endpoints. This is particularly true for findings that were only statistically significantly elevated in high dose females; cataracts - terminal; kidney dilation, tubilar - terminal; kidney edema, papilla - terminal; kidney hyperplasia, transitional cell - terminal; kidney mineralization, pelvic - terminal; kidney mineralization, tubular - terminal; kidney necrosis, papillary - terminal; kidney nephropathy, chronic progressive - interim and terminal; liver angiectasis - terminal; liver degeneration, cystic focal - interim and terminal; hypertrophy, hepatocyte, centrilobular - interim and terminal; hypertrophy, hepatocyte, panlobular - terminal; necrosis, hepatocytes, centrilobular- terminal; necrosis, individual hepatocyte - terminal; alveolar histiocytosis - terminal; pancreatic acinar cell hyperplasia - terminal; alopecia/hypotrichosis - terminal; stomach nonglandular hyperplasia, epithelia, limiting ridge - terminal; tongue hyperplasia, squamous cell - terminal; tongue inflammation, subacute/chronic - terminal
2-year Rats	Liver degeneration, cystic, focal - interim	2	males
2-year Rats	Liver degeneration, cystic, focal - Terminal	1	males
2-year Rats	Hypertrophy, hepatocyte, centrilobular - Terminal	1	males
2-year Rats	Necrosis, Hepatocytes, Centrilobular - Terminal	1	males
Repro/Devo Mice	Final body weight	2	Increases in weight is not easily interpreted from a tox perspective; data show that there were not obvious signs of maternal tox
Repro/Devo Mice	Brain weight to final body weight	3	May be affected by changes in overall body weight
Repro/Devo Mice	Epididymis weight to final body weight	3	May be affected by changes in overall body weight
Repro/Devo Mice	F0 Kidney weight absolute	3	May be affected by changes in overall body weight
Repro/Devo Mice	F0 Kidney weight to body weight	3	May be affected by changes in overall body weight
Repro/Devo Mice	F0 Kidney weight to brain weight	1	
Repro/Devo Mice	F0 Liver weight absolute	3	May be affected by changes in overall body weight

Repro/Devo Mice	F0 Liver weight to body weight	3	May be affected by changes in overall body weight
Repro/Devo Mice	F0 Liver weight to brain weight	1	Males and females
Repro/Devo Mice	Offspring weight PND 21	1	Males and females; do not model prior timepoints, weight at end nursing is best measure; body weight better than weight change
Repro/Devo Mice	Offspring weight change	3	Absolute weight is better measure
Repro/Devo Mice	Balanopreputial Separation	2	May be due to decreased body weight
Repro/Devo Mice	Vaginal patency	2	May be due to decreased body weight
Repro/Devo Mice	F1 Body weight PND 40	1	Indicates in utero and early life exposure can have potential developmental effects later in life
Repro/Devo Mice	F1 body weight change post-wean	3	Absolute weight better measure
Repro/Devo Mice	Food consumption	3	Subject to experimental error and difficult to accurately quantify
Repro/Devo Mice	Kidney - Chronic progressive nephropathy	1	
Repro/Devo Mice	Kidney - Hypertrophy, tubular cell	1	
Repro/Devo Mice	Hepatocellular hypertrophy, centrilobular/diffuse	1	Males and females
Repro/Devo Mice	Liver - mitotic figures increased	2	
Repro/Devo Mice	Liver - necrosis, focal/multifocal	1	Males and females
Repro/Devo Mice	Liver - necrosis, single cell	1	Males and females
Repro/Devo Mice	Liver - pigment increased	3	
Prenatal Devo Rats	Maternal weight during gestation - GD 21 (terminal)	1	Indicated maternal toxicity at highest dose
Prenatal Devo Rats	Maternal body weight change during gestation	3	Absolute weight better measure
Prenatal Devo Rats	Gravid uterine weight	3	Offspring weight and litter size better endpoints
Prenatal Devo Rats	Food consumption	3	Subject to experimental error and difficult to accurately quantify
Prenatal Devo Rats	Early deliveries	1	
Prenatal Devo Rats	Maternal liver weight	3	May not be independent of total body weight
Prenatal Devo Rats	Maternal kidney weight	3	May not be independent of total body weight
Prenatal Devo Rats	Hepatocellular hypertrophy	3	Not a sensitive endpoint
Prenatal Devo Rats	Liver necrosis, focal	3	Not a sensitive endpoint
Prenatal Devo Rats	Combined fetal weights	1	Developmental endpoint
Prenatal Devo Rats	Male fetal weights	1	Developmental endpoint
Prenatal Devo Rats	Female fetal weights	1	Developmental endpoint

Prenatal Devo Rats	Percent male offspring	3	
Prenatal Devo Rats	Percent female offspring	3	
Prenatal Devo Rats	Percent per litter with skeletal variations	1	Developmental/Teratology endpoint
Prenatal Devo Rats	Total percent per litter with variations	3	not very different from skeletal variations

Notes on choice of males or females: where a sex-specific difference in sensitivity was clear, the more sensitive sex will be used. Where statistically significant effects were seen at similar doses in both sexes, male and female data will be modeled separately
Note on 90-day rat, 2-year rat, and prenatal/developmental rat studies: large dose spacing may artificially inflate BMDL estimates

Primary	1
Secondary	2
Eliminated	3
Unsure	?

Organizer:	Behl, Betsy[Behl.Betsy@epa.gov]
From:	Behl, Betsy
Location:	CALL IN Conference Line / Ex. 6 CONF ID: **Personal Phone / Ex. 6**
Importance:	Normal
Subject:	discuss GenX project
Start Time:	Mon 3/26/2018 2:00:00 PM
End Time:	Mon 3/26/2018 3:00:00 PM
Required Attendees:	mina.shehee@dhhs.nc.gov; Beth.Dittman@dhhs.nc.gov; Strong, Jamiesandy.mort@ncdenr.govconnie.brower@ncdenr.gov; mina.shehee@dhhs.nc.gov; Beth.Dittman@dhhs.nc.gov; sandy.mort@ncdenr.gov
Optional Attendees:	Gillespie, Andrew; Jacobs, Brittany; Miller, Gregory; Allenbach, Becky; Mitchell, Ken; Adams, GlennPritchett, Jamie RPritchett, Jamie R

ECOS FED PART GENX PFBS PRESENTATION 03 06 18.pptx

GENX BIBLIO 03 02 18.docx

Looking forward to our conversation on Monday. I have attached above the problem formulation for GenX and our bibliography that we shared with a state group identified by ECOS for us to coordinate with.

Best, Betsy

Organizer:	Elizabeth Dittman[Beth.Dittman@dhhs.nc.gov]
From:	Elizabeth Dittman
Location:	Conference Line / Ex. 6 (passcode Personal Phone / Ex. 6
Importance:	Normal
Subject:	FW: Follow up call with NC DHHS re: PFECAs and PFAS
Start Time:	Tue 3/27/2018 7:00:00 PM
End Time:	Tue 3/27/2018 8:00:00 PM
Required Attendees:	Behl, Betsy; Holsinger, Hannah; Mclain, Jennifer; linda.culpepper@ncdenr.gov; Grevatt, Peter; Hall, Renea; Gillespie, Andrew; Suzanne.fenton@nih.gov; Flowers, Lynn; Gloria.post@dep.nj.gov; Pritchett, Jamie R; Shehee, Mina; Moore, Zack; Mort, Sandra L; Henry, Audra E. (ATSDR/DCHI/WB); idz7@cdc.gov; Chou, Selene (ATSDR/DTHHS/ETB); Scinicariello, Franco (ATSDR/DTHHS/ETB); Benson, Amy; Lau, Chris; Strynar, Mark; Lindstrom, Andrew; Allenbach, Becky; Patlewicz, Grace; Henry, Tala; Decker, John A. (CDC/ONDIEH/NCEH); Birnbaum, Linda (NIH/NIEHS) [E]; Blystone, Chad (NIH/NIEHS) [E]; Devito, Michael (NIH/NIEHS) [E]; bucher@niehs.nih.gov; Auerbach, Scott S (NIH/NIEHS) [E]; Maddaloni, Mark; Evangelista, Pat; Azzam, Nidal; Foster, Stiven; Crofton, Kevin; Sinks, Tom; Raffaele, Kathleen; Huff, Lisa; connie.brower@ncdenr.gov; Scott, Michael; Strong, Jamie

image003.png

I'll appreciate your recommendation on whether and how I participate on this call. I see that ATSDR, NIEHS, NIH, ORD, Regions and OW are all on the invite list. Thanks.

-----Original Appointment-----
From: Elizabeth Dittman
Sent: Thursday, March 22, 2018 10:03 AM
To: Elizabeth Dittman; linda.culpepper@ncdenr.gov; Holsinger, Hannah; Grevatt, Peter; Hall, Renea; Gillespie, Andrew; Suzanne.fenton@nih.gov; Flowers, Lynn; Gloria.post@dep.nj.gov; Pritchett, Jamie R; Shehee, Mina; Moore, Zack; Mort, Sandra L; Henry, Audra E. (ATSDR/DCHI/WB); idz7@cdc.gov; Chou, Selene (ATSDR/DTHHS/ETB); Scinicariello, Franco (ATSDR/DTHHS/ETB); Benson, Amy; Lau, Chris; Strynar, Mark; Lindstrom, Andrew; Allenbach, Becky; Behl, Betsy; Patlewicz, Grace; Henry, Tala; Decker, John A. (CDC/ONDIEH/NCEH); Birnbaum, Linda (NIH/NIEHS) [E]; Blystone, Chad (NIH/NIEHS) [E]; Devito, Michael (NIH/NIEHS) [E]; bucher@niehs.nih.gov; Auerbach, Scott S (NIH/NIEHS) [E]; Maddaloni, Mark; Evangelista, Pat; Azzam, Nidal; Foster, Stiven; Crofton, Kevin; Sinks, Tom; Raffaele, Kathleen; Huff, Lisa; connie.brower@ncdenr.gov; Scott, Michael; Strong, Jamie
Subject: FW: Follow up call with NC DHHS re: PFECAs and PFAS
When: Tuesday, March 27, 2018 3:00 PM-4:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: 515-739-1430 (passcode 418154)

From: Dittman, Elizabeth
Sent: Monday, February 26, 2018 8:12:49 PM UTC
To: Dittman, Elizabeth; Suzanne.fenton@nih.gov; Flowers, Lynn; Gloria.post@dep.nj.gov; Pritchett, Jamie R; Shehee, Mina; Moore, Zack; Mort, Sandra L; Henry, Audra E. (ATSDR/DCHI/WB); idz7@cdc.gov; Chou, Selene (ATSDR/DTHHS/ETB); Scinicariello, Franco (ATSDR/DTHHS/ETB); Benson, Amy; Lau, Chris; Strynar, Mark; Lindstrom, Andrew; Allenbach, Becky; Behl, Betsy; Patlewicz,

Grace; Henry, Tala; Decker, John A. (CDC/ONDIEH/NCEH); Birnbaum, Linda (NIH/NIEHS) [E]; Blystone, Chad (NIH/NIEHS) [E]; Devito, Michael (NIH/NIEHS) [E]; bucher@niehs.nih.gov; Auerbach, Scott S (NIH/NIEHS) [E]; Maddaloni, Mark; Evangelista, Pat; Azzam, Nidal; Foster, Stiven; Crofton, Kevin; Sinks, Tom; Raffaele, Kathleen; Huff, Lisa; connie.brower@ncdenr.gov; Scott, Michael; Strong, Jamie
Subject: Follow up call with NC DHHS re: PFECAs and PFAS
When: Tuesday, March 27, 2018 7:00 PM-8:00 PM.
Where: Conference Line / Ex. 6 (passcode Personal Phone / Ex. 6

All –

Your input and expertise has been crucial for N.C. in our response to GenX and other emerging PFAS in the state. We last had a group call with federal partners on October 11 regarding the important work going on at the federal level to better understand these compounds and their potential health effects, as well as how to address exposure to PFAS mixtures. I would like to schedule a follow up call. The focus of the call will be to hear updates on the various projects that each group is working on to help fill the knowledge gaps surrounding PFECAs and PFAS. I have scheduled a call for Tuesday March 27 at 3:00PM. The call-in number is Conference Line / Ex. 6) (passcode Personal Phone / Ex. 6 I hope you can join us. Please forward this invitation to folks in your organization that I may have missed.

Thank you all for your time and expertise.

~Beth Dittman

Beth Dittman
Toxicologist and Public Health Assessor
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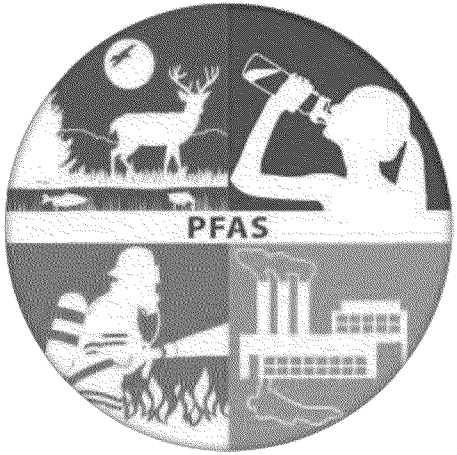


Technical Resources to Respond to Environmental Releases of Poly- and Perfluoroalkyl Substances (PFAS)

Patricia Reyes, Director
Interstate Technology & Regulatory Council

What Is ITRC?

- Public-private coalition working to reduce barriers to the use of innovative environmental technologies that reduce compliance costs and maximize cleanup efficacy.
- Produces documents and training that broaden and deepen technical knowledge and expedite quality regulatory decision-making while protecting human health and the environment.
- Technical teams composed of environmental professionals from state & federal agencies, industry, academia, and community stakeholders.
- Program of the Environmental Research Institute of the States (ERIS) and managed by the Environmental Council of the States (ECOS).
- To learn more: www.itrcweb.org

Why A PFAS Team?

- The volume of information regarding PFAS sources, site characterization, fate and transport, and remediation is growing rapidly
- PFAS compounds in the environment have become an emerging, worldwide priority
- State and federal environmental regulators need easily accessible information to aid them in evaluating risks and selecting appropriate response actions at PFAS release sites

Who Is On The PFAS Team?

- ITRC has assembled a team of over 290 PFAS experts from all sectors:
  - Academics, stakeholders and international – 15+
  - State and local – 60+ (30 states, including D.C.)
  - Federal (DOD, DOE, EPA, Other) – 40+
  - Industry and consulting – 160+
- The team is led by:
  - Bob Mueller, NJ DEP
  - Ginny Yingling, MN DOH
  - Lesley Hay Wilson, Sage Risk Solutions LLC

PFAS Team Goals

- The ITRC PFAS team will produce concise technical resources for project managers – regulators, consultants, responsible parties, and stakeholders
- 2017:
  - Series of six PFAS Fact Sheets
- 2018-2019:
  - Web-based Technical and Regulatory Guidance Document
  - Internet-based Training

2017: PFAS Fact Sheets

- Summarize key information in the following areas:
  - History, Use, and Environmental Sources
  - Nomenclature & Physical and Chemical Properties
  - Environmental Fate & Transport
  - Site Characterization Tools, Sampling Techniques, & Laboratory Analytical Methods
  - Remediation Technologies & Methods
  - Regulatory Summary
- Tailored to the needs of state regulatory program staff
  - Concise (10-12 pages or less)
  - Current references
  - Web-based, updated information tables

Web-based information tables

- Updatable as information evolves
- Standards and guidance values for PFAS in groundwater, drinking water, and surface water or effluent
- Residential soil standards and guidance values for PFAS
- Basis information for key standards and guidance values
- Physical and chemical properties of key PFAS compounds
- Remediation technologies comparison

Fact Sheet Writing Subgroup Leaders

- History & Use
  - Kate Emma Schlosser, NH DES
  - Jeff Hale, Kleinfelder
- Nomenclature and Phys-Chem
  - Tracie White, CO DPHE
  - Elizabeth Denly, TRC Solutions
- Regulatory Summary
  - Brie Sterling, PA DEP
  - Linda Hall, GSI Environmental
- Fate & Transport
  - Sandra Goodrow, NJ DEP
  - Sarah Gewurtz, GHD
- Site Characterization, Sampling Tech., & Lab Methods
  - Bob Delaney, MI DEQ
  - Janice Willey, NAVSEA
- Remediation Technologies
  - Jamie Wallerstedt, MN PCA
  - Bill DiGuiseppi, CH2M

Project Overview: 2018-2019

- Publish a web-based technical and regulatory guidance document:
  - More in-depth technical information on PFAS
  - Links to scientific literature
  - Regulatory information and links
  - Stakeholder perspectives
- Develop web-based training modules

June 5, 2017

PFAS Methods Call with ECOS/States
May 22, 2017
4:00-5:00 pm ET

State Participants:
Mark Smith (MA), Robert "Bob" Delaney (MI), Clark Freise (NH), Jason Fagel (NY), Nik Dzamov, Jen Allen and Susan Kessler (Ohio EPA), Nicole Marz (OR), Kelly Matthews (WA), Chuck Schwer (VT), Sarah Grace Longsworth (ECOS), Alan Roberson and Darrell Osterhoudt (ASDWA)

Also Janice Willey (Navy/ITRC PFAS team analytical methods workgroup co-chair with Bob Delaney/MI)

EPA Participants:
Chris Impellitteri (ORD), Cindy Caporale (Region 3), Steven Foster, Linda Gaines and Jodi? (OLEM), Betsy Behl (OW), Bobbi Carter - Region 4 (ORD lead region coordinator), Jennifer Orme-Zavaleta, Kacee Deener and Lynn Flowers (ORD), Lisa Matthews/State Liaison (ORD State Liaison)

The purpose of this call was to share information on PFAS analytical methods work and provide background in summary of the March 27th call. The EPA PFAS Analytical Methods Workgroup (co-chairs: Cindy Caporale, Region 3; Schatzi Fitz-James, OLEM; and Chris Impellitteri, ORD) provided updates and states shared information.

Chris Impellitteri:

- Regarding the Drinking Water Method 537:
  - There are 6 per- and polyfluorinated alkyl substances (PFAS) under the 3rd Unregulated Contaminants monitoring rule (UCMR3)
  - Eight additional PFAS not listed on UCMR3
  - Finished (treated) drinking water samples

- Non-DW Sample Methods
  - Focus is to be towards simplicity, robustness, production lab use, and minimizing sample transfers, extractions, filter steps, chemical additions (e.g. pH adjustments)
  - Find a balance among sensitivity, ease of implementation, and monitoring requirements

- Method Validation: Ground, Surface, and Waste Waters
  - 24 PFAS (including all target analytics in EPA Method 537)
  - Methods under consideration (all using LC/MS/MS)
    - Direct injection
    - Solid phase extraction (with and without radio-labeled internal standard correction (i.e., isotope dilution)
  - Direct injection based on EPA Region 5/Chicago Regional Laboratory Method (in the middle of this and hope to have all data in ~2 weeks [and then] run statistical analyses)
    - Similar to draft American Society for Testing and Materials (ASTM) Method D7979
    - Phase 1: 5 internal (EPA) lab validation (commenced in April 2017)
    - Phase 2: 5 external (outside of EPA) lab validation (~August 2017)
      - Looking at working with APHL on Phase 2 validation studies (Kacee Deener, EPA POC)

        - EPA is also interested in talking with ECOS about states to participate in Phase 2 validation (Lisa Matthews, EPA POC)
    - Target Detection Limits: 10's nanogram/L
        - Bob Delaney (MI) stated this likely will be a problem for them, as it is difficult to get into the heart of a plume – 1-200 ppt detection limit. Will be difficult for federal facilities.
    - Assess methods through spring/summer 2017
    - Publish draft method in fall 2017
- Method Validation: Solids
    - Soils, sediments, sludge/biosolids
    - Same 24 PFAS as for water (non-DW) methods
    - Commence in early summer 2017
    - Targeting Fall 2017 for draft methods
    - Target Detection Limits: 10's – 100's nanogram/L
        - Higher due to complexity of matrix
    - <u>Two Methods:</u>
        - Similar to ASTM D7968-17 (Determination of Polyfluorinated Compounds in Soil by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)
        - Draft Procedure for Analysis of Perfluorinated Carboxylic Acids and Sulfonic Acids in Sewage Sludge and Biosolids by HPLC/MS/MS (EPA-ORD National Exposure Research Laboratory and EPA Office of Water)

- Sampling and Storage
    - Holding time studies
    - Sample vessel materials (glass, polycarbonate, high-density polyethylene)
    - Standard operating procedures for field sampling (initial focus on groundwater)

Chris Impellitteri: (Opening statement to Q&A): Work focuses on samples that are not DW samples.

Bob Delaney (MI): Radiometric question asking is this isotope dillution?
Answer: Yes, other companies will be coming up with new standards, but as of now, *Wellington* is the only company providing samples.

MA: asked about PFAS.

Lynn Flowers (ORD): EPA is getting organized, identifying a cross-Agency coordinator, briefings for new Administrator, then work to get around to share more with states and others.

States having to deal with problems now or ignore them.
- EPA doesn't yet have the data pulled together – only have pieces of data at this time.

State asked if these pieces of data could be shared with them
- Lynn said pieces wouldn't likely be useful and there isn't a complete literature search.

UCMR analyte list – states need tox info.

NJ has done a lot on PFNA – MA said they already have this information.

June 5, 2017

ITRC PFAS Team Analytical methods workgroup:

- Tight timeframe
- PFAS is complex to work with
- Developing a 10-page fact sheet covering sampling analysis, methods, and site characterization
- September 15 draft fact sheet due to editor/expect end of year release

NH: Has completed proficiency testing

Call was adjourned.

To: Behl, Betsy[Behl.Betsy@epa.gov]
From: Mort, Sandra L
Sent: Tue 7/3/2018 8:08:06 PM
Subject: RE: [External] RE: request for GenX RfD process update

Thanks Betsy.

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
(919) 218-5580 - Mobile
sandy.mort@ncdenr.gov

1601 Mail Service Center
Raleigh, NC 27699-1601

From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, July 3, 2018 3:36 PM
To: Mort, Sandra L <sandy.mort@ncdenr.gov>
Subject: [External] RE: request for GenX RfD process update

The report went to the external peer reviewers last week. In May, other federal agencies requested to be able to review the document before it was sent to peer review so we lost several months. This was a change to how we typically develop health advisories so it was not expected. Our new date for release is late September. That was the date we provided to the NC SAB (as reported in Inside EPA).

Happy 4th to you!!

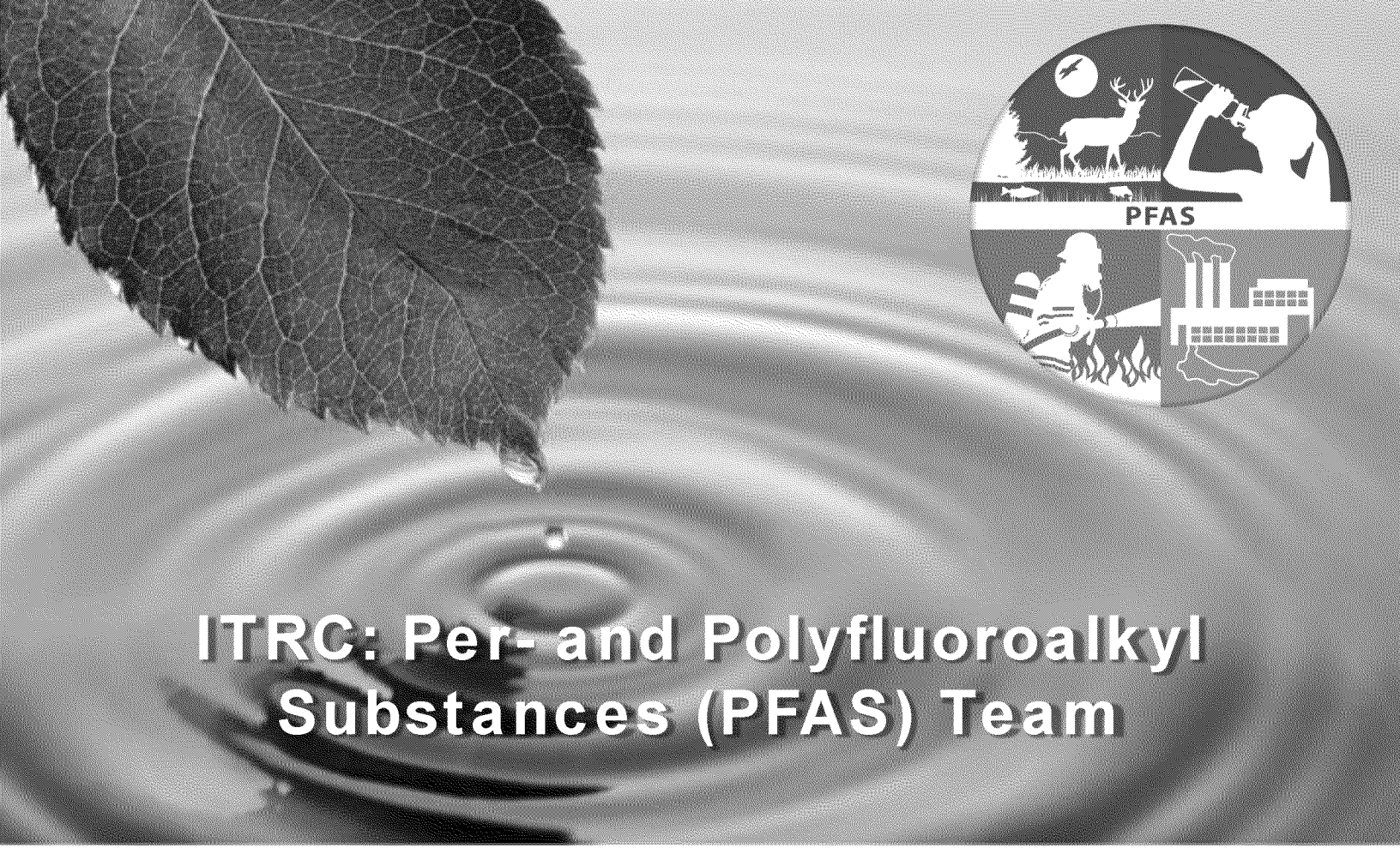
From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Tuesday, July 03, 2018 10:39 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: request for GenX RfD process update

Betsy –
NC DEQ is requesting an update on EPA's process toward developing a GenX RfD. Has the draft report advanced to the Independent External Peer Review step that was projected for June 2018? And, does EPA still anticipate the release of the draft document before September?
Happy 4th!
b/r
Sandy Mort

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
(919) 218-5580 - Mobile
sandy.mort@ncdenr.gov

1601 Mail Service Center
Raleigh, NC 27699-1601



ITRC: Per- and Polyfluoroalkyl Substances (PFAS) Team

WWW.ITRCWEB.ORG

Advancing Environmental Solutions

INTERSTATE COUNCIL ITRC TECHNOLOGY REGULATORY

Interstate Technology & Regulatory Council (ITRC)

- Public-private coalition working to reduce barriers to the use of innovative environmental technologies.
- Produces documents and training that broaden and deepen technical knowledge and expedite quality regulatory decision-making while protecting human health and the environment.
- More at www.itrcweb.org

ITRC PFAS Team

- Purpose: produce concise technical resources for project managers – regulators, consultants, responsible parties, and stakeholders

- Why: State and federal environmental regulators and others need easily accessible information to aid them in evaluating risks and selecting appropriate response actions at PFAS release sites

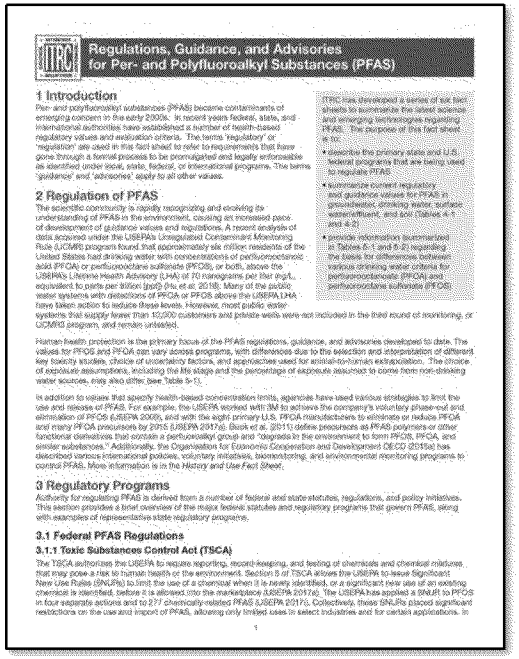
ITRC PFAS Team

- ITRC has assembled a team of over 330 PFAS experts from all sectors:
  - Academics – 12
  - Stakeholders – 3
  - Federal (DOD, DOE, EPA, Other)– 45
  - State and local – 72
  - Industry and consulting – 190
  - International – 8

ITRC PFAS Team: Products

- Factsheets
  - History and Use (Nov. 2017)
  - Naming Conventions and Physical and Chemical Properties (Nov. 2017)
  - Regulations, Guidance, and Advisories (Nov. 2017)
  - Fate and Transport (Feb. 2018)
  - Site Characterization, Sampling Techniques, and Lab Analytical Methods (Feb. 2018)
  - Remediation Technologies (Feb. 2018)
  - AFFF (to be published mid-2018)
- Web-based, updated information tables
- Technical/Regulatory Document (to be published 2019)
- Internet Based Training (to go live in late 2019)

ITRC PFAS Team: Factsheets



Regulations, Guidance, and Advisories for Per- and Polyfluoroalkyl Substances (PFAS)

1 Introduction

Per- and polyfluoroalkyl substances (PFAS) became contaminants of emerging concern in the early 2000s. In recent years federal, state, and international authorities have established a number of health-based regulatory values and evaluation criteria. The terms 'regulatory' or 'regulation' are used in this fact sheet to refer to requirements that have gone through a formal process to be promulgated and legally enforceable as identified under local, state, federal, or international programs. The terms 'guidance' and 'advisories' apply to all other values.

ITRC has developed a series of six fact sheets to summarize the latest science and emerging technologies regarding PFAS. The purpose of this fact sheet is to:

- describe the primary state and U.S. federal programs that are being used to regulate PFAS
- summarize current regulatory and guidance values for PFAS in groundwater, drinking water, surface water/effluent, and soil (Tables 4-1 and 4-2)
- provide information (summarized in Tables 5-1 and 5-2) regarding the basis for differences between various drinking water criteria for perfluorooctanoic (PFOA) and perfluorooctane sulfonate (PFOS)

2 Regulation of PFAS

The scientific community is rapidly recognizing and evoking its understanding of PFAS in the environment, causing an increased pace of development of guidance values and regulations. A recent analysis of data acquired under the USEPA's Unregulated Contaminant Monitoring Rule (UCMR) program found that approximately six million residents of the United States had drinking water with concentrations of perfluorooctanoic acid (PFOA) or perfluorooctane sulfonate (PFOS), or both, above the USEPA's Lifetime Health Advisory (LHA) of 70 nanograms per liter (ng/L, equivalent to parts per billion [ppb] (Hu et al. 2016). Many of the public water systems with detections of PFOA or PFOS above the USEPA LHA have taken action to reduce these levels. However, most public water systems that supply fewer than 10,000 customers and private wells were not included in the third round of monitoring, or UCMR3 program, and remain unlisted.

Human health protection is the primary focus of the PFAS regulations, guidance, and advisories developed to date. The values for PFOS and PFOA can vary across programs, with differences due to the selection and interpretation of different key toxicity studies, choice of uncertainty factors, and approaches used for animal-to-human extrapolation. The choice of exposure assumptions, including the life stage and the percentage of exposure assumed to come from non-drinking water sources, may also differ (see Table 5-1).

In addition to values that specify health-based concentration limits, agencies have used various strategies to limit the use and release of PFAS. For example, the USEPA worked with 3M to achieve the company's voluntary phase-out and elimination of PFOS (USEPA 2006), and with the eight primary U.S. PFOA manufacturers to eliminate or reduce PFOA and many PFOA precursors by 2015 (USEPA 2017a). Buck et al. (2011) define precursors as PFAS polymers or other functional derivatives that contain a perfluoroalkyl group and "degrade in the environment to form PFOS, PFOA, and similar substances." Additionally, the Organisation for Economic Cooperation and Development (OECD 2015a) has described various international policies, voluntary initiatives, biomonitoring, and environmental monitoring programs to control PFAS. More information is in the *History and Use Fact Sheet*.

3 Regulatory Programs

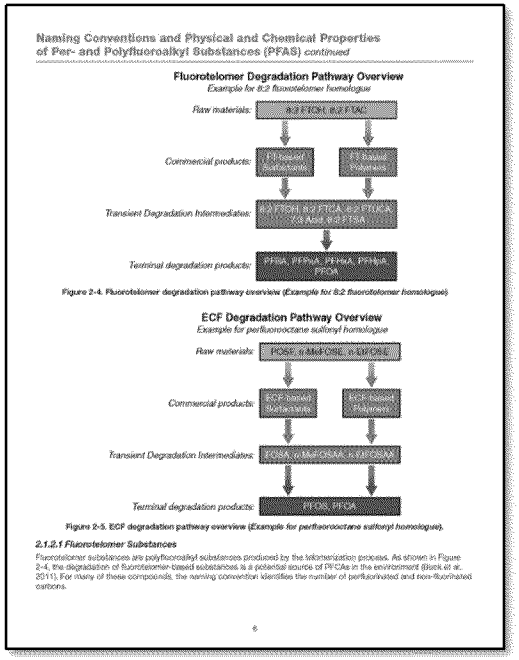
Authority for regulating PFAS is derived from a number of federal and state statutes, regulations, and policy initiatives. This section provides a brief overview of the major federal statutes and regulatory programs that govern PFAS, along with examples of representative state regulatory programs.

3.1 Federal PFAS Regulations

3.1.1 Toxic Substances Control Act (TSCA)

The TSCA authorizes the USEPA to require reporting, record-keeping, and testing of chemicals and chemical mixtures that may pose a risk to human health or the environment. Section 5 of TSCA allows the USEPA to issue Significant New Use Rules (SNURs) to limit the use of a chemical when it is newly identified, or a significant new use of an existing chemical is identified, before it is allowed into the marketplace (USEPA 2017d). The USEPA has applied a SNUR to PFOS in four separate actions and to 277 chemically-related PFAS (USEPA 2017c). Collectively, these SNURs placed significant restrictions on the use and import of PFAS, allowing only limited uses in select industries and for certain applications. In

1



Naming Conventions and Physical and Chemical Properties of Per- and Polyfluoroalkyl Substances (PFAS) *continued*

Fluorotelomer Degradation Pathway Overview

Example for 8:2 fluorotelomer homologue

Figure 2-4. Fluorotelomer degradation pathway overview (Example for 8:2 fluorotelomer homologue)

ECF Degradation Pathway Overview

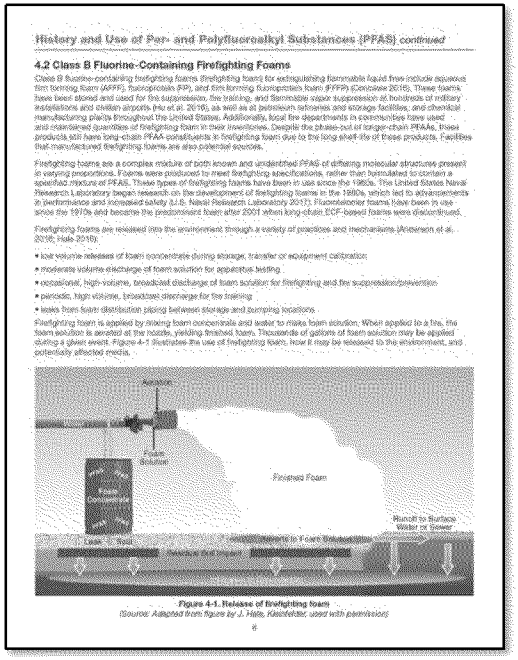
Example for perfluorooctane sulfonyl homologue

Figure 2-5. ECF degradation pathway overview (Example for perfluorooctane sulfonyl homologue).

2.1.2.1 Fluorotelomer Substances

Fluorotelomer substances are polyfluoroalkyl substances produced by the telomerization process. As shown in Figure 2-4, the degradation of fluorotelomer-based substances is a potential source of PFCAs in the environment (Buck et al. 2011). For many of these compounds, the naming convention identifies the number of perfluorinated and non-fluorinated carbons.

6



History and Use of Per- and Polyfluoroalkyl Substances (PFAS) *continued*

4.2 Class B Fluorine-Containing Firefighting Foams

Class B fluorine-containing firefighting foams (firefighting foam) for extinguishing flammable liquid fires include aqueous film forming foam (AFFF), fluoroprotein (FP), and film forming fluoroprotein foam (FFFP) (Concawe 2016). These foams have been stored and used for fire suppression, fire training, and flammable vapor suppression at hundreds of military installations and civilian airports (Hu et al. 2016), as well as at petroleum refineries and storage facilities, and chemical manufacturing plants throughout the United States. Additionally, local fire departments in communities have used and maintained quantities of firefighting foam in their inventories. Despite the phase-out of longer-chain PFAAs, these products still have long-chain PFAA constituents in firefighting foam due to the long shelf life of these products. Facilities that manufactured firefighting foams are also potential sources.

Firefighting foams are a complex mixture of both known and unidentified PFAS of differing molecular structures present in varying proportions. Foams were produced to meet firefighting specifications, rather than formulated to contain a specified mixture of PFAS. These types of firefighting foams have been in use since the 1960s. The United States Naval Research Laboratory began research on the development of firefighting foams in the 1960s, which led to advancements in performance and increased safety (U.S. Naval Research Laboratory 2017). Fluorotelomer foams have been in use since the 1970s and became the predominant foam after 2001 when long-chain ECF-based foams were discontinued.

Firefighting foams are released into the environment through a variety of practices and mechanisms (Anderson et al. 2016; Hale 2016):

- low volume releases of foam concentrate during storage, transfer or equipment calibration
- moderate volume discharge of foam solution for apparatus testing
- occasional, high-volume, broadcast discharge of foam solution for firefighting and fire suppression/prevention
- periodic, high volume, broadcast discharge for fire training
- leaks from foam distribution piping between storage and pumping locations

Firefighting foam is applied by mixing foam concentrate and water to make foam solution. When applied to a fire, the foam solution is aerated at the nozzle, yielding finished foam. Thousands of gallons of foam solution may be applied during a given event. Figure 4-1 illustrates the use of firefighting foam, how it may be released to the environment, and potentially affected media.

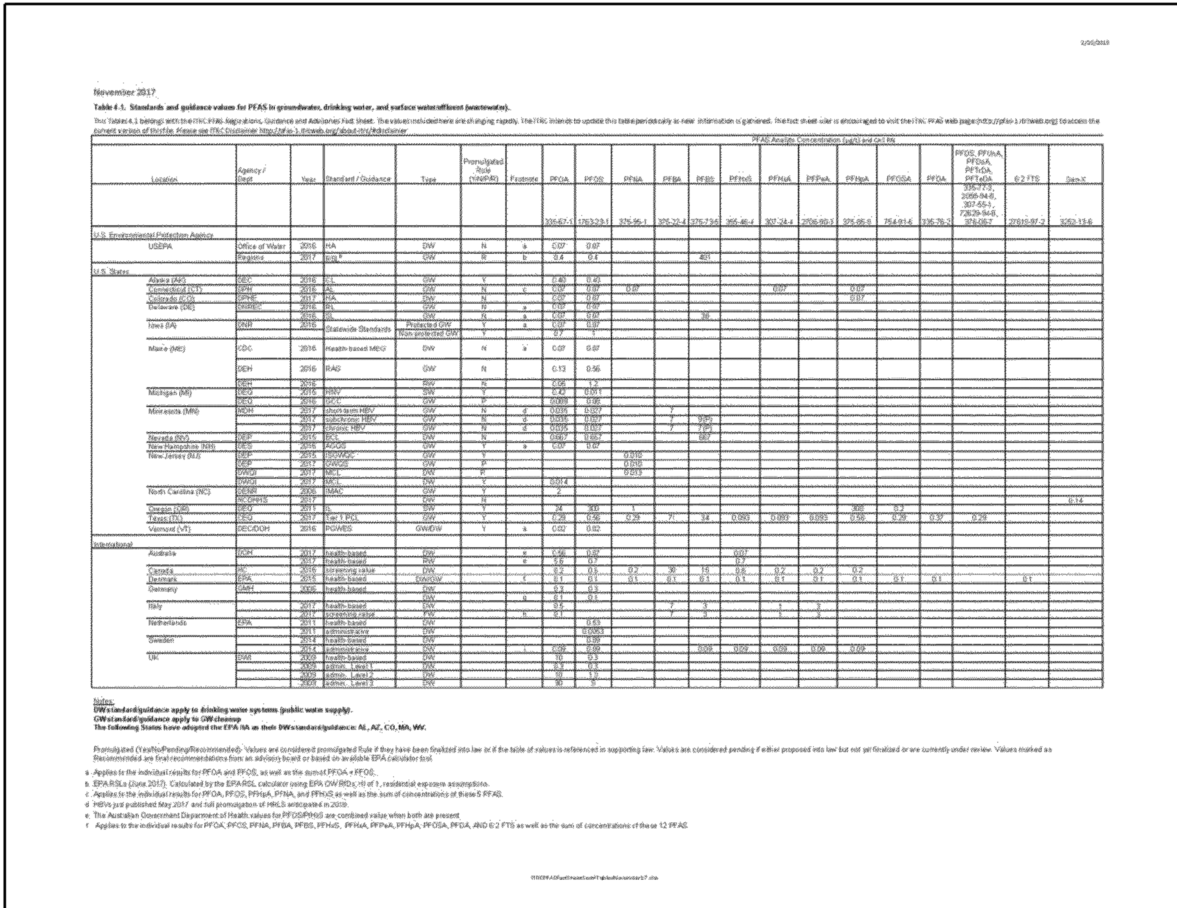
Figure 4-1. Release of firefighting foam

(Source: Adapted from figure by J. Hale, Kleinfelder, used with permission)

6

Spanish language versions also available

ITRC PFAS Team: Data Tables



November 2017

Table 4-1. Standards and guidance values for PFAS in groundwater, drinking water, and surface water/effluent (wastewater).

Location	Agency / Dept	Year	Standard / Guidance	Type	Promulgated Rule (Y/N/P/R)	Footnote	PFOA	PFOS	PFNA	PFBA	PFBS	PFHxS	PFHxA	PFPeA	PFHpA	PFOSA	PFDA	PFDS, PFUnA, PFDoA, PFTrDA, PFTeDA	6:2 FTS	Gen-X
							335-67-1	1763-23-1												
U.S. Environmental Protection Agency																				
USEPA	Office of Water	2016	HA	DW	N	a	0.07	0.07												
U.S. States																				

DW standard/guidance apply to drinking water systems (public water supply).
GW standard/guidance apply to GW cleanup.
The following States have adopted the EPA HA as their DW standard/guidance: AL, AZ, CO, MA, WV.

ITRC plans to regularly update on-line data tables

ECOS-EPA PFAS Call Agenda
Monday, February 26, 2018
4:00-5:00 pm Eastern

Dial in Conference Line / Ex. 6 **code** Personal Phone / Ex. 6
Webinar link: http://epawebconferencing.acms.com/pfascallfeb26/
*Please dial *6 to mute your lines during the call.*
*To be heard, you must press *6 to unmute your line, and *6 again to re-mute it.*

4:00 Welcome
Jennifer Orme-Zavaleta, US EPA's Office of Research and Development (ORD)

4:05 EPA ORD's Human Health/Toxicity Research for PFAS
Reeder Sams, US EPA ORD's National Center for Computational Toxicology

4:25 Report Out: Federal Information Exchange on PFAS
Annette Guiseppi-Elie, US EPA ORD's National Exposure Research Laboratory

4:40 ITRC PFAS Team: Fact Sheets and Regulatory Guidance Document
Ginny Yingling, Minnesota Department of Health

Any time remaining will be open forum to share info (states)

5:00 Adjourn

Summary of Actions at WPAFB to address PFAS contamination

Bonnie Buthker

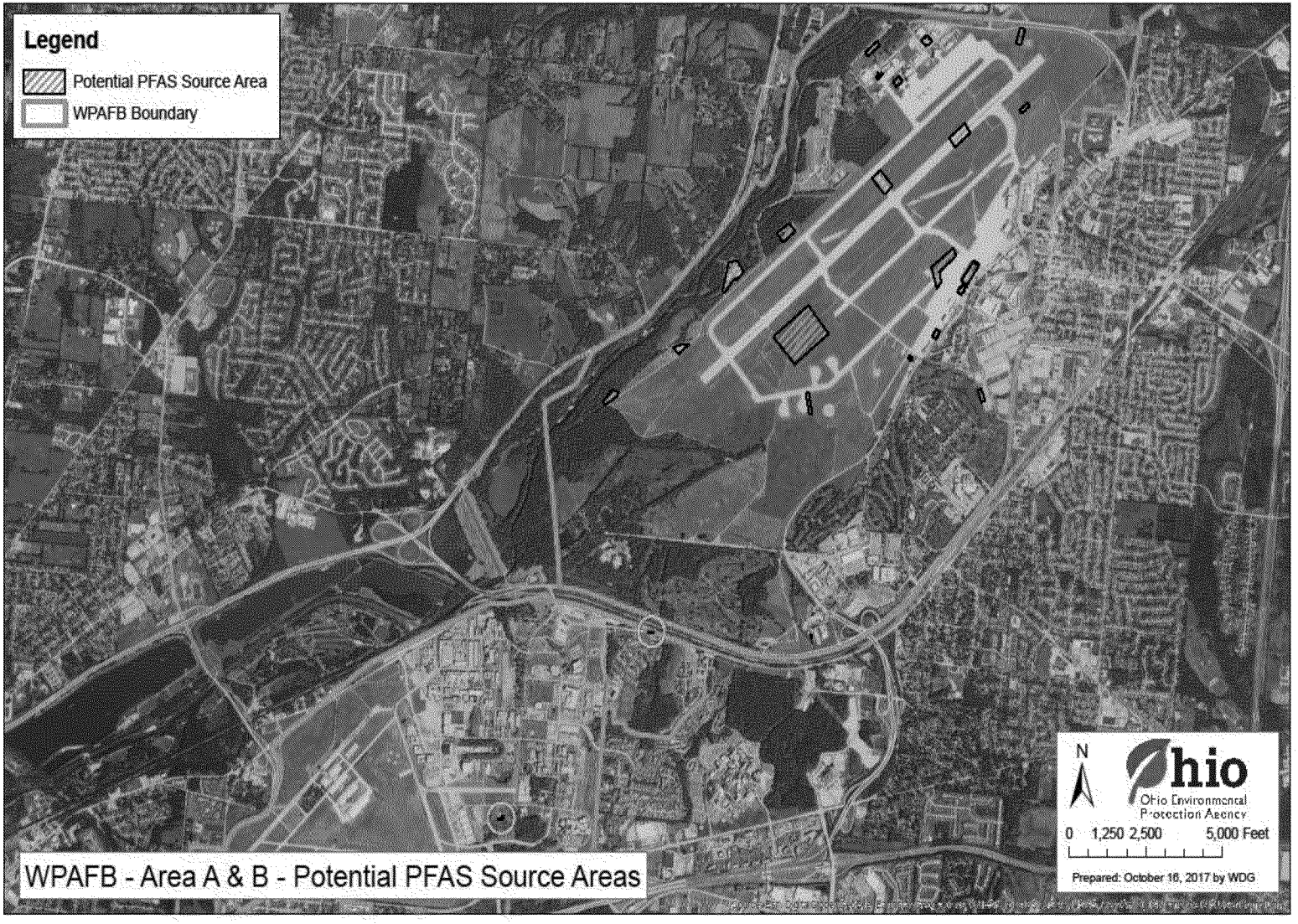
Ohio EPA

Ohio Environmental Protection Agency

Initial Response:

- Through UCMR sampling, WPAFB detects PFOS in distribution samples collected from their drinking water system
- Based on info – Ohio EPA then recommended WPAFB collect samples to determine which water supply wells were impacted
- Air Force also decided to move up site investigation from beginning of 2017 to late spring 2016

Ohio Environmental Protection Agency


Legend
Potential PFAS Source Area
WPAFB Boundary
N
Ohio
Ohio Environmental Protection Agency
0 1,250 2,500 5,000 Feet
Prepared: October 16, 2017 by WDG
WPAFB - Area A & B - Potential PFAS Source Areas

Initial response continued

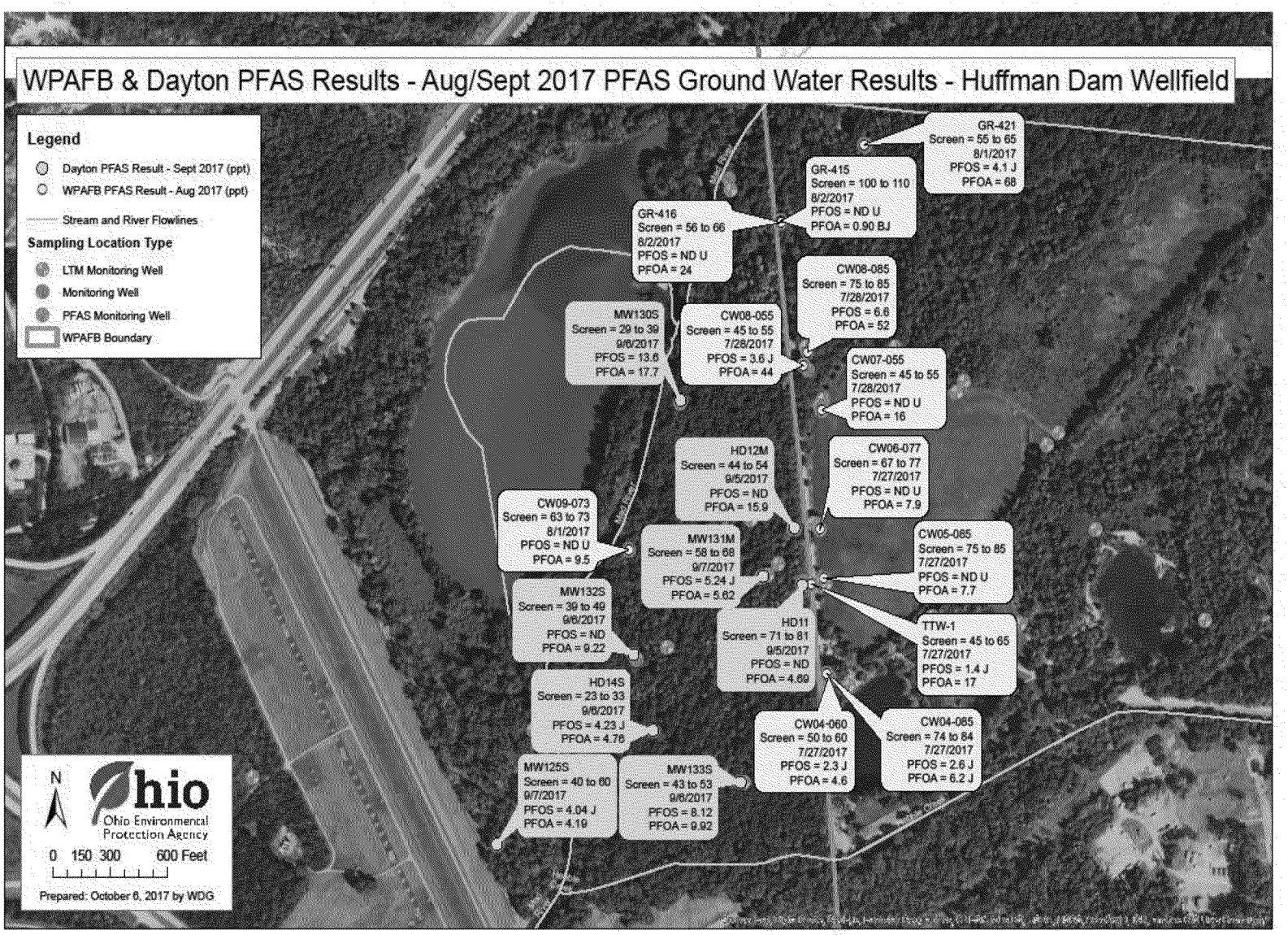
- US EPA issues new health advisory – and PFOS results from entry points and another production well are above this level
- Ohio EPA requests WPAFB take this well offline and provide bottled water to sensitive populations
- When WPAFB does not comply, Ohio EPA issues Emergency Orders

Ohio Environmental Protection Agency

Actions to Protect Unimpacted wells:

- WPAFB, Ohio EPA, and US EPA developed a sentinel well network that would be sampled quarterly
- Three sampling rounds have been completed
- Surface water and sediment samples have also been collected

Ohio Environmental Protection Agency


WPAFB & Dayton PFAS Results - Aug/Sept 2017 PFAS Ground Water Results - Huffman Dam Wellfield
Legend
Dayton PFAS Result - Sept 2017 (ppt)
WPAFB PFAS Result - Aug 2017 (ppt)
Stream and River Flowlines
Sampling Location Type
LTM Monitoring Well
Monitoring Well
PFAS Monitoring Well
WPAFB Boundary
GR-421
Screen = 55 to 65
8/1/2017
PFOS = 4.1 J
PFOA = 68
GR-415
Screen = 100 to 110
8/2/2017
PFOS = ND U
PFOA = 0.90 BJ
GR-416
Screen = 56 to 66
8/2/2017
PFOS = ND U
PFOA = 24
CW08-085
Screen = 75 to 85
7/28/2017
PFOS = 6.6
PFOA = 52
MW130S
Screen = 29 to 39
9/6/2017
PFOS = 13.6
PFOA = 17.7
CW08-055
Screen = 45 to 55
7/28/2017
PFOS = 3.6 J
PFOA = 44
CW07-055
Screen = 45 to 55
7/28/2017
PFOS = ND U
PFOA = 16
HD12M
Screen = 44 to 54
9/5/2017
PFOS = ND
PFOA = 15.9
CW06-077
Screen = 67 to 77
7/27/2017
PFOS = ND U
PFOA = 7.9
CW09-073
Screen = 63 to 73
8/1/2017
PFOS = ND U
PFOA = 9.5
MW131M
Screen = 58 to 68
9/7/2017
PFOS = 5.24 J
PFOA = 5.62
CW05-085
Screen = 75 to 85
7/27/2017
PFOS = ND U
PFOA = 7.7
MW132S
Screen = 39 to 49
9/6/2017
PFOS = ND
PFOA = 9.22
HD11
Screen = 71 to 81
9/5/2017
PFOS = ND
PFOA = 4.69
TTW-1
Screen = 45 to 65
7/27/2017
PFOS = 1.4 J
PFOA = 17
HD14S
Screen = 23 to 33
9/6/2017
PFOS = 4.23 J
PFOA = 4.76
CW04-060
Screen = 50 to 60
7/27/2017
PFOS = 2.3 J
PFOA = 4.6
CW04-085
Screen = 74 to 84
7/27/2017
PFOS = 2.6 J
PFOA = 6.2 J
MW125S
Screen = 40 to 60
9/7/2017
PFOS = 4.04 J
PFOA = 4.19
MW133S
Screen = 43 to 53
9/6/2017
PFOS = 8.12
PFOA = 9.92
N
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0 150 300 600 Feet
Prepared: October 6, 2017 by WDG

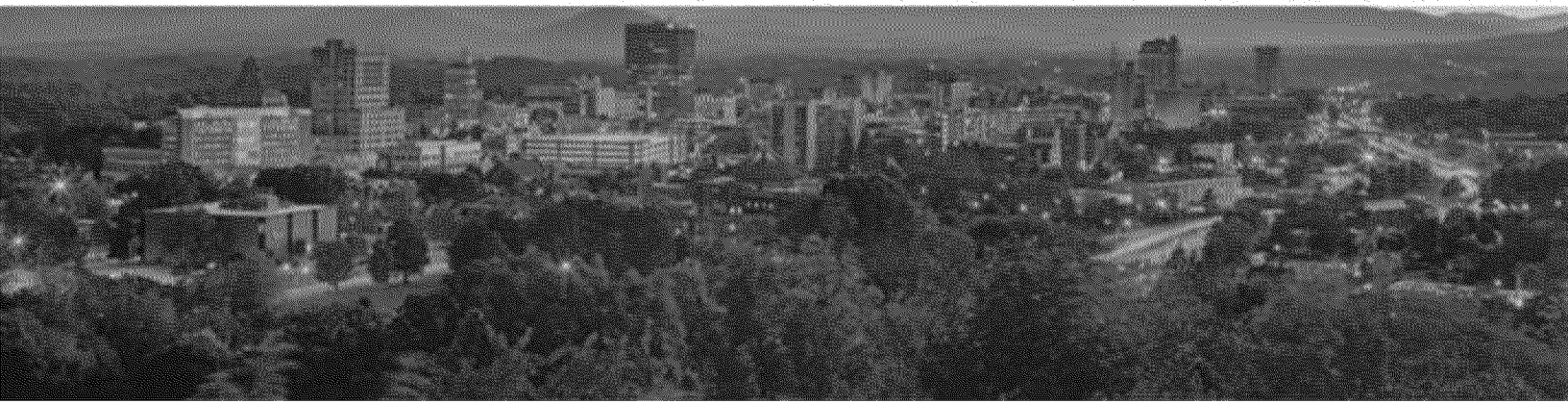
Next Challenges:

- Air Force is hesitant to begin remedial investigation to determine nature and extent
- Dayton has temporarily limited pumping of Huffman Dam production wells
- Dayton also wants the Air Force to take actions to prevent further migration of PFAS

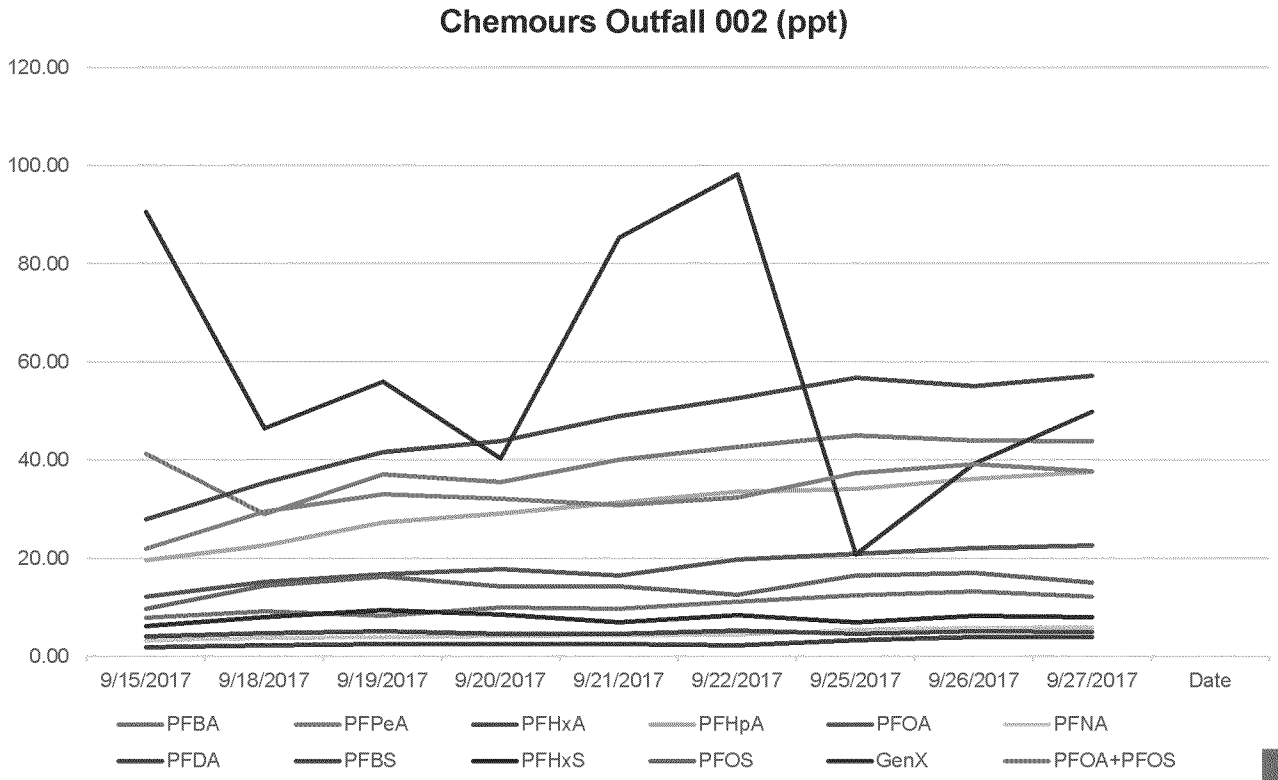
Ohio Environmental Protection Agency

Nothing Compares
NORTH CAROLINA

GenX in the Cape Fear River Basin
Presentation to ECOS – EPA PFAS Call
October 30, 2017



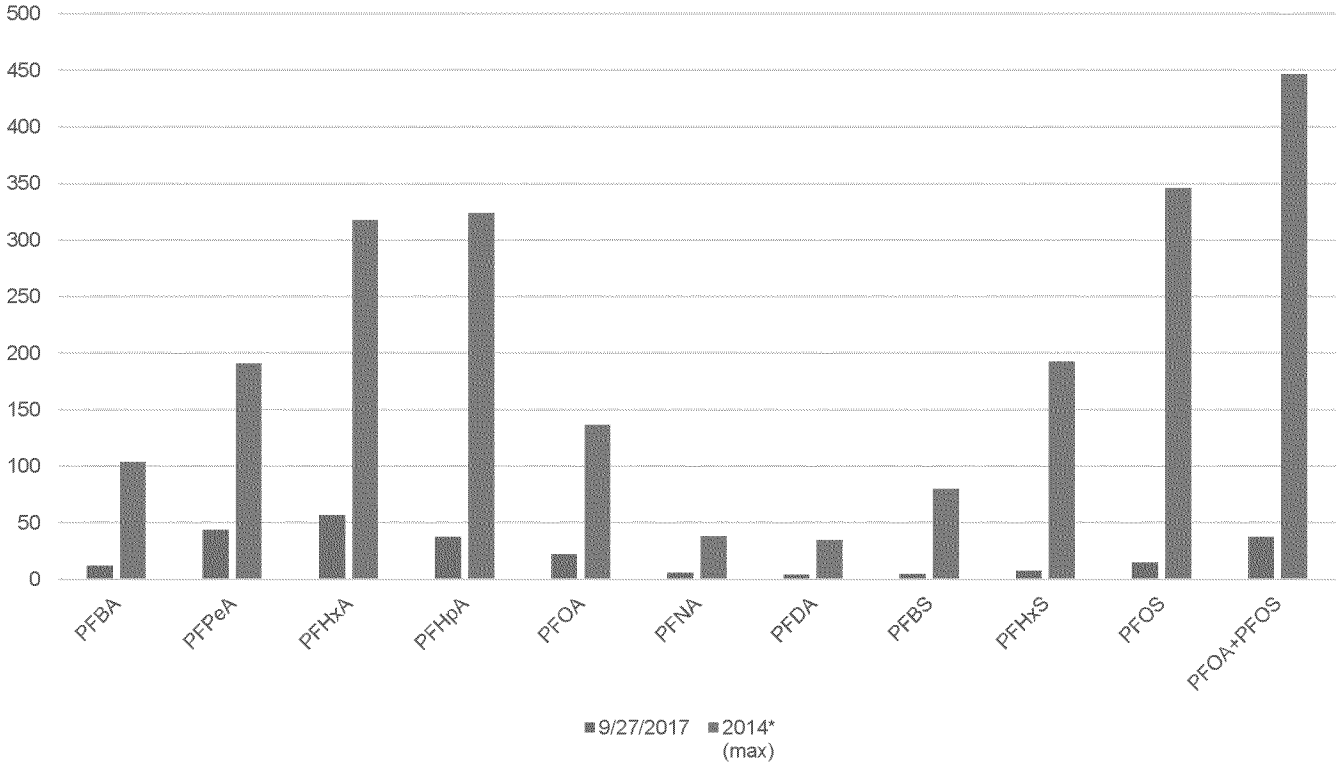
Latest Cape Fear River Sampling Data



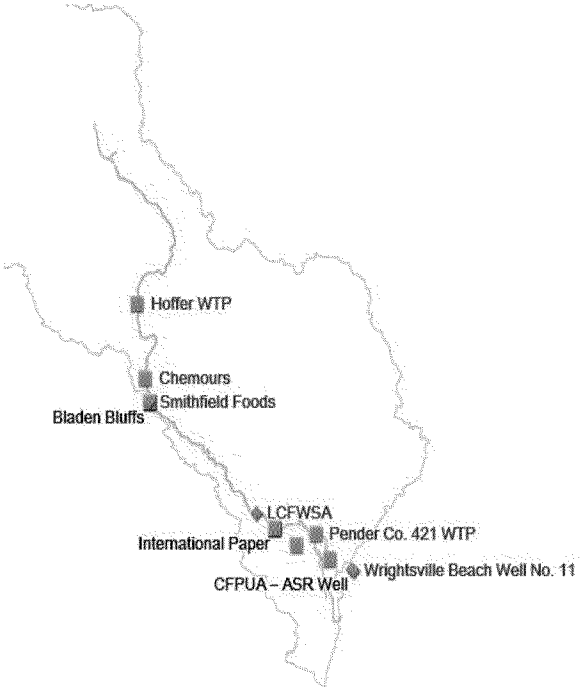
Drinking Water Samples

		Results (ppt)		
		9/14/2017	9/21/2017	9/28/2017
International Paper	PFOA	3.65	2.97	3.74
	PFOS	1.64 (J)	1.21 (J)	1.40 (J)
	PFOA+PFOS	5.29 (J)	4.18 (J)	5.14 (J)
	GenX	30.2	33.4	35.3
Cape Fear Public Utility	PFOA	15.1	10.1	12.1
	PFOS	17.2	17.3	14.5
	PFOA+PFOS	32.3	27.4	26.6
	GenX	33.2	36.1	28.9
Pender County	PFOA	12.2	2.74	2.87
	PFOS	0.544 (J)	1.02 (J)	0.977 (J)
	PFOA+PFOS	4.36 (J)	3.76 (J)	3.85 (J)
	GenX	40.4	41.0	42.4
NW Brunswick County	PFOA	9.98	7.96	8.16
	PFOS	7.78	5.98	7.78
	PFOA+PFOS	16.0	15.7	8.2
	GenX	33.1	35.0	24.3

Historic Comparison



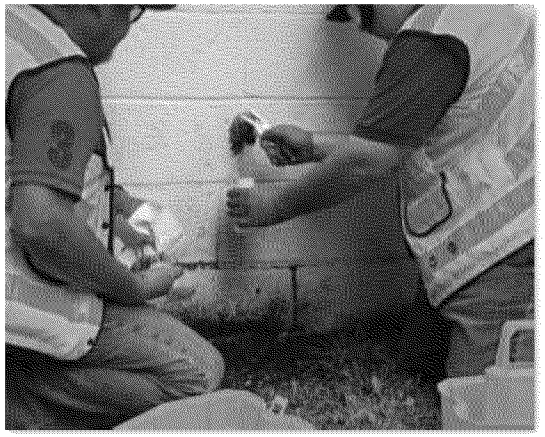
DEQ Sampling



- Process area sampling at Chemours.
- Weekly composite sampling at the Chemours NPDES outfall 002.
- Weekly sampling of finished drinking downstream of the Chemours facility.

Private Well Sampling Results

Private wells sampled:	110
Total # wells with exceedance of the GenX NC DHHS provisional health goal:	40 (36%)
Total # wells reported as not-detected (ND):	36 (33%)
Total # wells with a GenX detection (includes those above the health goal):	74 (67%)
Total # wells with a GenX detection less than the health goal:	34 (31%)
The maximum detected GenX concentration is	1300 ng/L (ppt)



Chemours Sampling Map (Northern Area)

Chemours Sampling Map (Central Area)

Chemours Sampling Map (Southern Area)

Chemours reported air emissions (pounds per year)

	2012	2013	2014	2015	2016
C3 dimer acid fluoride	500	539	545	669	591
C3 dimer acid (GenX)	1	3	4	3	3
C3 dimer acid ammonium salt	1	3	3	2	2

- All data based on chemical process computational model.
- Air emission data for other emerging contaminants has been received and is being analyzed by staff.
- Source information, emissions data, and stack parameters needed to conduct air dispersion modeling has been received.

Stack Testing

- DAQ and Chemours discussing/evaluating appropriate methods
- No "off the shelf" method. Developing test methods that will capture and measure the contaminants of interest
- Chemours has indicated that they will test to better quantify air emissions as soon as measurement issues are resolved.

Ambient Air Quality Monitoring

- DAQ and EPA discussing/evaluating appropriate methods, equipment and lab capabilities
- Do the contaminants act as a gas or a particle?
- What analytical detection limits are possible?

RECAP ACTIVITIES

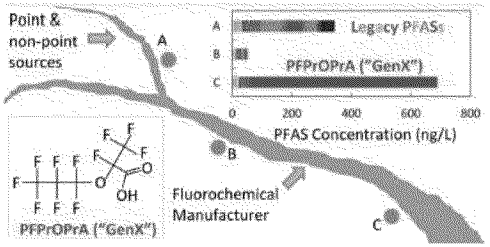
- Monitoring the Facility for surface water and groundwater and
- Air emissions modeling
- Continuing to delineate off-site groundwater contamination and its potential sources
- Reviewing private well water data from Chemours and DEQ for data analysis, data QC, HREs, planning and mapping
- Evaluating chemical pathways (chemicals created and transformed)
- Determine future sampling needs
- Continuing to host community meetings
- Engaging Federal/State and International partners

Questions?

Sheila Holman
Assistant Secretary
NC Department of Environmental Quality
919-707-8619

Perspective on R4 / NC DEQ Partnership

United States Environmental Protection Agency



- **Consistent with Cooperative Federalism**
  - **ECOS: " . . . to understand how best to respond to complex environmental pollution challenges, to respond to emerging pollutants, to incorporate modern technologies . . ."**
  - **EPA's new Strategic Plan Goal 2: supporting the primary implementers of environmental programs—states and tribes "to create tangible environmental results for the American people."**
- **Serves as model for NJ, NH, ME, R1, R2 . . .**
- **Built on history of research internationally recognized and nationally relevant**
- **Non-Targeted Analysis (NTA) – key unique capability to assist states**
- **Challenging question / issues of communication and decision in face of uncertainty**

To: Joseph.Haney@tceq.texas.gov[Joseph.Haney@tceq.texas.gov]; Behl, Betsy[Behl.Betsy@epa.gov]; Strong, Jamie[Strong.Jamie@epa.gov]; Jacobs, Brittany[jacobs.brittany@epa.gov]; Brinkerhoff, Chris[Brinkerhoff.Chris@epa.gov]; Gibbons, Catherine[Gibbons.Catherine@epa.gov]; Sasso, Alan[Sasso.Alan@epa.gov]; Thayer, Kris[thayer.kris@epa.gov]; Stern, Alan[Alan.Stern@dep.nj.gov]
Cc: Mort, Sandra L[sandy.mort@ncdenr.gov]; Elizabeth Dittman[Beth.Dittman@dhhs.nc.gov]; james.bateson@ncdenr.gov[james.bateson@ncdenr.gov]
From: Mort, Sandra L
Sent: Fri 6/15/2018 2:27:40 PM
Subject: NC Secretaries' SAB meeting presentations on Monday, June 18th
SAB Agenda DETAIL_6-18-18.docx

All –
I am emailing you to confirm that you received the email yesterday with the WebEx connection information for Monday's (6/18/18) NC Secretaries' Science Advisory Board meeting. Attached is a detailed agenda that identifies the time of your presentations/discussion (in Raleigh NC time, EDT). Just for safety sake, I request that you email me and Louise Hughes (louise.hughes@ncdenr.gov) a copy of your presentation materials if you have not done so already, should we have WebEx issues. If you have any questions, please contact me. You can reach me at anytime at my mobile number (including over the weekend).

THANK YOU ALL
Sandy

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
(919) 218-5580 - Mobile
sandy.mort@ncdenr.gov

1646 Mail Service Center
Raleigh, NC 27699-1646

Agenda Detail - June 18, 2018 SAB Meeting, Raleigh NC (All times are Raleigh, NC EDT)

10:00 am I. Call to Order
II. Ethics Statement
III. Approval of April 30th meeting minutes

10:15 am IV. GenX

a. DHHS presentation – BMD Modeling
Beth Dittman, MS
Public Health Assessor, NC DHHS

10:30 am b. GenX Report, SAB

11:00 am c. Update on USEPA's GenX RfD Development
Elizabeth (Betsy) Behl, Director
Health and Ecological Criteria Division
Office of Science and Technology, Office of Water (OST, OW)
USEPA, Washington, DC
With: Brittany Jacobs, Jamie Strong, Chris Brinkerhoff

12:00 pm V. Lunch

1:30 pm VI. Trichloroethylene (TCE) Vapor Intrusion and Inhalation Action Levels
James Bateson, Superfund Section Chief
Division of Waste Management, NC DEQ
and
Sandy Mort, PhD
Environmental Toxicologist, NC DEQ

2:00 pm VII. Hexavalent Chromium

a. Update on the IRIS Hexavalent Chromium Review
Catherine Gibbons, Ph.D.
Biologist, IRIS Program
US EPA Office of Research and Development (ORD)
National Center for Environmental Assessment (NCEA)
With: Alan Sasso, Kris Thayer

3:00 pm b. Texas CEQ's Hexavalent Chromium RfD
Joseph Haney, MS
Toxicologist
Toxicology Division
Texas Commission on Environmental Quality

3:30 pm c. NJ DEP's Hexavalent Chromium Cancer Slope Factor
Alan H. Stern, DrPH, DABT
Chief, Bureau for Risk Analysis
Division of Science, Research and Environmental Health
NJ Dept. Environmental Protection

4:00 pm VIII. Public Forum

IX. Next Meetings
August 20, 2018
October 1, 2018

To: Behl, Betsy[Behl.Betsy@epa.gov]; Strong, Jamie[Strong.Jamie@epa.gov]; Jacobs, Brittany[jacobs.brittany@epa.gov]; Brinkerhoff, Chris[Brinkerhoff.Chris@epa.gov]
From: Hughes, Louise G
Sent: Thur 6/14/2018 6:12:41 PM
Subject: Upcoming SSAB meeting - presentation

Dr. Behl –
Thank you for agreeing to present at the upcoming North Carolina Secretaries' Science Advisory Board (NC SSAB) meeting on Monday, June 18th. We have your *Update on EPA's GenX RfD Development* scheduled for 11-12 am (Raleigh NC time).). Following are WebEx_meeting links that we will be using. Should we have issues with the web-based presentation, or the system is not functioning at a level needed for a web-based presentation, I ask that you please email a copy of your presentation materials to me and Louise Hughes (louise.hughes@ncdenr.gov) before the weekend. This will enable us to present your slides locally with your narration provided by phone.

If you have ANY questions, please do not hesitate to call me at the number below, or Louise Hughes at (919) 707-8655 (office) or Personal Phone / Ex. 6 (mobile).
You can reach me the day of the meeting, or during the meeting at (919) 218-5580, or by email (sandy.mort@ncdenr.gov).

Thank you again for assisting the efforts of the NC SSAB.

b/r
Sandy Mort

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
sandy.mort@ncdenr.gov

1646 Mail Service Center
Raleigh, NC 27699-1646

Louise G. Hughes
Executive Assistant to Assistant Secretary Sheila Holman
North Carolina Department of Environmental Quality

(919) 707-8655 office
louise.hughes@ncdenr.gov

217 West Jones Street
1601 Mail Service Center
Raleigh, NC 27699

Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties.

To: Strong, Jamie[Strong.Jamie@epa.gov]
Cc: Behl, Betsy[Behl.Betsy@epa.gov]; Jacobs, Brittany[jacobs.brittany@epa.gov]; Miller, Gregory[Miller.Gregory@epa.gov]; Shehee, Mina[mina.shehee@dhhs.nc.gov]
From: Dittman, Elizabeth
Sent: Wed 6/6/2018 12:41:57 PM
Subject: RE: [External] paragraph on NC assessment for review

Jamie,

Apologies for the delay. We do not have any revisions. Thank you for the opportunity to review!

~Beth

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
NC Department of Health and Human Services

Office: 919 707 5906
Fax: 919 870 4807
Beth.Dittman@dhhs.nc.gov

5505 Six Forks Road
1912 Mail Service Center
Raleigh, NC 27699

Twitter | Facebook | YouTube | LinkedIn

From: Strong, Jamie [mailto:Strong.Jamie@epa.gov]
Sent: Monday, June 4, 2018 1:09 PM
To: Dittman, Elizabeth <Beth.Dittman@dhhs.nc.gov>
Cc: Behl, Betsy <Behl.Betsy@epa.gov>; Jacobs, Brittany <jacobs.brittany@epa.gov>; Miller, Gregory <Miller.Gregory@epa.gov>; Shehee, Mina <mina.shehee@dhhs.nc.gov>
Subject: RE: [External] paragraph on NC assessment for review

Beth,
Any comments on this paragraph? Thanks, we are trying to wrap up revisions to our agency review.

Thanks,
Jamie

From: Dittman, Elizabeth [mailto:Beth.Dittman@dhhs.nc.gov]
Sent: Tuesday, May 29, 2018 12:19 PM
To: Strong, Jamie <Strong.Jamie@epa.gov>
Cc: Behl, Betsy <Behl.Betsy@epa.gov>; Jacobs, Brittany <jacobs.brittany@epa.gov>; Miller, Gregory <Miller.Gregory@epa.gov>; Shehee, Mina <mina.shehee@dhhs.nc.gov>
Subject: RE: [External] paragraph on NC assessment for review

Jamie,

Thank you for the opportunity to review. We will look at it this week and let you know if we have any comments. I want to clarify what report this will be in – I am assuming by "in our document" you are referring to the EPA's write up of your derivation of the GenX reference dose? Let me know if this assumption is correct.

Thank you,

~Beth

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services

919 707 5906 office
919 870 4807 fax
Beth.Dittman@dhhs.nc.gov

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Raleigh, NC 27699

From: Strong, Jamie [mailto:Strong.Jamie@epa.gov]
Sent: Tuesday, May 29, 2018 11:52 AM
To: Dittman, Elizabeth <Beth.Dittman@dhhs.nc.gov>
Cc: Behl, Betsy <Behl.Betsy@epa.gov>; Jacobs, Brittany <jacobs.brittany@epa.gov>; Miller, Gregory <Miller.Gregory@epa.gov>; Shehee, Mina <mina.shehee@dhhs.nc.gov>
Subject: [External] paragraph on NC assessment for review

Beth,

We have a brief write up of NC provisional drinking water value for GenX chemicals in our document. Can you please review and get back to us with any edits? We want to make sure that it accurately presents your preliminary assessment. If you could get back to us this week, I would appreciate it.
Thanks,
Jamie

North Carolina Assessment

The North Carolina Department of Health and Human Services (NC DHHS) released a health assessment and provisional drinking water health goal for GenX chemicals in July 2017. North Carolina defines *health goal* as a nonregulatory, non-enforceable level of contamination below which no adverse health effects would be expected over a lifetime of exposure. The provisional health goal for exposure to GenX chemicals in drinking water is 0.140 µg/L, which is intended to protect the most sensitive population, namely bottle-fed infants. The state selected bottle-fed infants as the most sensitive population because they drink the largest volume of water per body weight (BW).

North Carolina's provisional health goal is based on a reference dose (RfD) derived from a no-observed-adverse-effect level (NOAEL) of 0.1 mg/kg/day for liver effects (single cell necrosis) in mice (DuPont-24459 2008; DuPont-18405-1037 2010). The total uncertainty factor (UF) applied was 1,000, including individual factors to account for interspecies

variability (10), intraspecies variability (10), and extrapolation from a subchronic to a chronic exposure duration (10). This RfD was used to derive a drinking water equivalent level (DWEL), which considers exposure. The DWEL was calculated using BW and drinking water intake for bottle-fed infants and a relative source contribution of 20% to account for potential exposure to GenX chemicals from other routes including air, soil, dust, and food. Additional details are available at NC DHHS.

Jamie B. Strong | Chief, Human Health Risk Assessment Branch
Health and Ecological Criteria Division | Office of Science and Technology | Office of Water
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW, 4301-T, Washington, DC 20460
☎ Phone: (202) 566-0056 | strong.jamie@epa.gov

To: Behl, Betsy[Behl.Betsy@epa.gov]
Cc: Shehee, Mina[mina.shehee@dhhs.nc.gov]; Moore, Zack[zack.moore@dhhs.nc.gov]
From: Dittman, Elizabeth
Sent: Wed 5/30/2018 1:07:19 PM
Subject: NC DHHS Benchmark Dose Modeling Report
NC DHHS BMD Report 26May2018.pdf

Betsy,

Please see attached for the NC DHHS Benchmark Dose Modeling Report for GenX that was created in response to a request from the North Carolina Secretaries' Science Advisory Board. Please pass along to members of your group who are working on the EPA GenX assessment and may be interested. Do not hesitate to reach out with any questions or concerns. We look forward to continued communication with your group as we move forward addressing the PFAS issue in our state.

Thank you,

~Beth

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services

919 707 5906 office
919 870 4807 fax
Beth.Dittman@dhhs.nc.gov

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Raleigh, NC 27699

To: Elizabeth Dittman[Beth.Dittman@dhhs.nc.gov]
Cc: Behl, Betsy[Behl.Betsy@epa.gov]; Jacobs, Brittany[jacobs.brittany@epa.gov]; Miller, Gregory[Miller.Gregory@epa.gov]; mina.shehee@dhhs.nc.gov[mina.shehee@dhhs.nc.gov]
From: Strong, Jamie
Sent: Tue 5/29/2018 3:51:43 PM
Subject: paragraph on NC assessment for review

Beth,

We have a brief write up of NC provisional drinking water value for GenX chemicals in our document. Can you please review and get back to us with any edits? We want to make sure that it accurately presents your preliminary assessment. If you could get back to us this week, I would appreciate it.

Thanks,
Jamie

North Carolina Assessment

The North Carolina Department of Health and Human Services (NC DHHS) released a health assessment and provisional drinking water health goal for GenX chemicals in July 2017. North Carolina defines *health goal* as a nonregulatory, non-enforceable level of contamination below which no adverse health effects would be expected over a lifetime of exposure. The provisional health goal for exposure to GenX chemicals in drinking water is 0.140 µg/L, which is intended to protect the most sensitive population, namely bottle-fed infants. The state selected bottle-fed infants as the most sensitive population because they drink the largest volume of water per body weight (BW).

North Carolina's provisional health goal is based on a reference dose (RfD) derived from a no-observed-adverse-effect level (NOAEL) of 0.1 mg/kg/day for liver effects (single cell necrosis) in mice (DuPont-24459 2008; DuPont-18405-1037 2010). The total uncertainty factor (UF) applied was 1,000, including individual factors to account for interspecies variability (10), intraspecies variability (10), and extrapolation from a subchronic to a chronic exposure duration (10). This RfD was used to derive a drinking water equivalent level (DWEL), which considers exposure. The DWEL was calculated using BW and drinking water intake for bottle-fed infants and a relative source contribution of 20% to account for potential exposure to GenX chemicals from other routes including air, soil, dust, and food. Additional details are available at NC DHHS.

Jamie B. Strong | Chief, Human Health Risk Assessment Branch
Health and Ecological Criteria Division | Office of Science and Technology | Office of Water
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW, 4301-T, Washington, DC 20460
☎ Phone: (202) 566-0056 | ✉ strong.jamie@epa.gov

To: Tobias, David[Tobias.David@epa.gov]; connie.brower@ncdenr.gov[connie.brower@ncdenr.gov]
Cc: Behl, Betsy[Behl.Betsy@epa.gov]
From: Ventaloro, Christopher
Sent: Wed 4/4/2018 5:41:32 PM
Subject: Re: [External] Re: BAFs / BCFs for perfluorinated compounds
PFOA_PFOS_BCF_summary_042018.xlsx

Hello David,

We in North Carolina are continuing to investigate options for establishing surface water standards for perfluorinated compounds. As we discussed during our phone conversation back in December, one of the challenges we face is the availability and selection of appropriate bioconcentration factors for calculating standards to protect for fish consumption and water supply uses.

Since PFOA & PFOS have been the subject of some investigation over the years we decided to start there to see what literature we could find that might provide BCFs/BAFs. The attached table provides a summary of what I found based on the articles I had access to (unfortunately, we have limited access to scientific literature).

I would be very grateful if you and/or your colleagues could review this and provide feedback. Right now, using only the information in the tables, I am leaning towards the geometric mean of the Martin et al. and Inoue et al. BCF values for PFOA and PFOS as being most appropriate. Any thoughts on this would be greatly appreciated!

We would also greatly appreciate any advice that you might have for selecting appropriate BCFs/BAFs as well as any recommendations you have concerning additional literature that would be useful.

Thank you for your time and assistance.

Sincerely,

Christopher Ventaloro

Water Quality Standards Specialist

Division of Water Resources

Department of Environmental Quality

919 707-9016 office

christopher.ventaloro@ncdenr.gov

Mailing Address: 1611 Mail Service Center Raleigh, NC 27699-1611

Physical Address: 512 North Salisbury St., Raleigh, NC 27604

From: Tobias, David <Tobias.David@epa.gov>
Sent: Friday, December 15, 2017 1:08 PM
To: Ventaloro, Christopher; Brower, Connie
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

If you would like more papers on the BCF/BAF of the traditional PFAS, we can also send those to you.

Is that what you are looking for? Just the shorter chain/lower MW version (C4-C8?) or was that just because of what you found in this article.

There is a good review article by the Mabury group in Toronto that I can dig up and send to you, but maybe you could list what your questions are?

This paper (Rayne et al) is based on predictions but many of these have measured BCF/BAF/BMF based on lab and field studies.

David A. Tobias

202.564.8534

6334 P - WJC East

Risk Assessment Division (RAD)

Office of Pollution Prevention and Toxics (OPPT)

My office hours : 8:30 am - 5:00 pm

From: Ventaloro, Christopher [mailto:christopher.ventaloro@ncdenr.gov]
Sent: Friday, December 15, 2017 8:50 AM
To: Tobias, David <Tobias.David@epa.gov>; connie.brower@ncdenr.gov
Subject: Re: [External] Re: BAFs / BCFs for perfluorinated compounds

Hi, David.

Thanks for sharing the two HFPO papers. They are a great help!

I am curious if you are familiar with the following paper and any thoughts you might have on it.

Rayne S, Forest K, Friesen KJ. (2009). Estimated bioconcentration factors (BCFs) for the C(4) through C(8) perfluorinated alkylsulfonic acid (PFSA) and alkylcarboxylic acid (PFCA) congeners. *J Environ Sci Health A Tox Hazard Subst Environ Eng.* May;44(6):598-604.

RIVM (2010).

We are continuing to gather information for as many PFCs as we can, unfortunately, we are not provided funding to purchase articles. If you can offer any insight as to the results of this paper or if you have a copy to share we would be most grateful!

Thanks again for all of your help and have a great holiday!

Christopher Ventaloro

Water Quality Standards Specialist

Division of Water Resources

Department of Environmental Quality

919 807 6421 office

christopher.ventaloro@ncdenr.gov

Mailing Address: 1611 Mail Service Center Raleigh, NC 27699-1611

Physical Address: 512 North Salisbury St., Raleigh, NC 27604

From: Brower, Connie
Sent: Tuesday, December 12, 2017 1:49:13 PM
To: Tobias, David
Cc: Ventaloro, Christopher
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Thanks, so much!

From: Tobias, David [mailto:Tobias.David@epa.gov]
Sent: Monday, December 11, 2017 6:16 PM
To: Brower, Connie <connie.brower@ncdenr.gov>
Cc: Ventaloro, Christopher <christopher.ventaloro@ncdenr.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Hello Connie and Chris

This is the ADME study that was performed on genx (HFPO-DA).

We can talk about it if you need to. I know these aren't fish, but it is a confirming piece of evidence that genx half-lives in animals are shorter than other PFCs (e.g. PFOS). I know you might not have seen this kind of data for other PFCs but some have longer half-lives than seen here for genx.

Tell me if you have questions.

David A. Tobias

202.564.8534

6334 P - WJC East

Risk Assessment Division (RAD)

Office of Pollution Prevention and Toxics (OPPT)

My office hours : 8:30 am - 5:00 pm

From: Tobias, David
Sent: Thursday, December 07, 2017 3:11 PM
To: 'Brower, Connie' <connie.brower@ncdenr.gov>
Cc: Ventaloro, Christopher <christopher.ventaloro@ncdenr.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Pan BAF from China

Hoke BCF from Dupont

David A. Tobias

202.564.8534

6334 P - WJC East

Risk Assessment Division (RAD)

Office of Pollution Prevention and Toxics (OPPT)

My office hours : 8:30 am - 5:00 pm

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Thursday, December 07, 2017 12:43 PM
To: Tobias, David <Tobias.David@epa.gov>
Cc: Ventaloro, Christopher <christopher.ventaloro@ncdenr.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

David – 3 pm is fine

My number should be appearing on the e-mails! I am so sorry!

919 807 6416

We will call you at 3!

No worries

Connie and Chris

From: Tobias, David [mailto:Tobias.David@epa.gov]
Sent: Thursday, December 07, 2017 11:43 AM
To: Brower, Connie <connie.brower@ncdenr.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Or better after 3pm.

David A. Tobias

202.564.8534

6334 P - WJC East

Risk Assessment Division (RAD)

Office of Pollution Prevention and Toxics (OPPT)

My office hours : 8:30 am - 5:00 pm

From: Tobias, David
Sent: Thursday, December 07, 2017 11:35 AM
To: 'Brower, Connie' <connie.brower@ncdenr.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Sorry Connie

I have a conflict at 1pm. Is there any time from 2-5 pm that works for you?

I was going to call you, but I don't see your phone number in the emails.

David A. Tobias

202.564.8534

6334 P - WJC East

Risk Assessment Division (RAD)

Office of Pollution Prevention and Toxics (OPPT)

My office hours : 8:30 am - 5:00 pm

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Thursday, December 07, 2017 8:41 AM
To: Tobias, David <Tobias.David@epa.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Hi David –

Chris Ventaloro and I will give you a call. The others are just interested in the issues.

Connie

From: Tobias, David [mailto:Tobias.David@epa.gov]
Sent: Wednesday, December 06, 2017 5:23 PM
To: Brower, Connie <connie.brower@ncdenr.gov>; Behl, Betsy <Behl.Betsy@epa.gov>
Cc: Grzyb, Julie <julie.grzyb@ncdenr.gov>; Manning, Jeff <jeff.manning@ncdenr.gov>; Strong, Jamie <Strong.Jamie@epa.gov>; Ventaloro, Christopher <christopher.ventaloro@ncdenr.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Good afternoon Connie

Sure I can talk tomorrow at 1pm.

Sorry for the late response, I was in a public meeting today on new chemical TSCA issues.

There are a lot of people on this email. Will this be a person to person call (Connie and I) or will there be a conference number needed?

Look forward to talking to you

David A. Tobias

202.564.8534

6334 P - WJC East

Risk Assessment Division (RAD)

Office of Pollution Prevention and Toxics (OPPT)

My office hours : 8:30 am - 5:00 pm

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Wednesday, December 06, 2017 10:28 AM

To: Behl, Betsy <Behl.Betsy@epa.gov>
Cc: Grzyb, Julie <julie.grzyb@ncdenr.gov>; Manning, Jeff <jeff.manning@ncdenr.gov>; Strong, Jamie <Strong.Jamie@epa.gov>; Tobias, David <Tobias.David@epa.gov>; Ventaloro, Christopher <christopher.ventaloro@ncdenr.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

I am so grateful! Thanks, Betsy! And David!

David –

May I contact you tomorrow (Thursday 12/7) around 1:00 PM?

Connie

From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, December 05, 2017 4:51 PM
To: Brower, Connie <connie.brower@ncdenr.gov>
Cc: Grzyb, Julie <julie.grzyb@ncdenr.gov>; Manning, Jeff <jeff.manning@ncdenr.gov>; Strong, Jamie <Strong.Jamie@epa.gov>; Tobias, David <Tobias.David@epa.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Connie, please follow up with David Tobias (202.564.8534). David works in the Risk Assessment Division in EPA's Office of Pollution Prevention and Toxics (OPPT). He has data and expertise on bioaccumulation of GenX in fish tissue and is ready to assist you.

Please let me know if you have additional questions

Best, Betsy

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]

Sent: Tuesday, December 05, 2017 3:27 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Cc: Grzyb, Julie <julie.grzyb@ncdenr.gov>; Manning, Jeff <jeff.manning@ncdenr.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Hi Betsy –

Our Science Advisor Board met yesterday – and yet, again, the subject of BAFs for the perfluorinated compounds (in this case Gen X) came up. Can you provide me with a contact for this question? We are definitely in need of assistance as our NPDES permitting group needs to establish a permit limit, and the citizens really are concerned with consumption of the fish , as Wilmington is a vacation/fishing destination.

Regards,

Connie

From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, October 17, 2017 11:41 AM
To: Brower, Connie <connie.brower@ncdenr.gov>
Subject: [External] Re: BAFs / BCFs for perfluorinated compounds

Connie, thanks for the note and reminder. I will look into this and get back to you.

Sent from my iPhone

On Oct 17, 2017, at 10:38 AM, Brower, Connie <connie.brower@ncdenr.gov> wrote:

> Hi Betsy –
>
> We are still working on the issues related to "GenX" PFAAs in the Cape Fear River. It is a challenge, for sure. At the ACWA Vermont meeting you mentioned that you may be able to assist in finding BCFs/ BAFs for the class of compounds, or (hopefully) more specific information on "GenX" itself.
>
> We're you able to find anyone to aid us? Any assistance is useful, as we are trying to be prepared for these questions with respect to potential development of water quality standards.

Regards,

Connie

PFOA BCF/BAF Summary Table					
Study	BCF	Geomean	BAF	Geomean	Species
Martin et al; 2003	4 27 8	9.5	ND	ND	*Oncorhynchus mykiss* (rainbow trout)
Fernandez-Sanjuan et al; 2012	500(?)	500(?)	ND	ND	*Dreissena polymorpha* (zebra mussel)
Inoue et al, 2012	3.1 9.4	5.4	ND	ND	*Cyprinus carpio* (common carp)
Iwabucchi, et al; 2015	ND	ND	330	330	*Oryzias latipes* (medaka)
Pan et al; 2017	ND	ND	85 17 2.9	16.1	*Cyprinus carpio* (common carp)

References

Fernandez-Sanjuan M., Faria M, Lacorte S., Barata C. Bioaccumulation and effects of perfluorinated com

Inoue Y., Hashizume N., Yakata N., Murakami H., Suzuki Y., Kikushima E., Otsuka M. Unique Physiochemi

Iwabuchi K., Senzaki N., Tsuda S., Wantanabe H., Tamura I., Takanobu H., Tatarazako N. Bioconcentration

Martin J., Mabury S., Solomon K., Muir D. Bioconcentration and Tissue Distribution of Perfluorinated Aci

Pan Y., Zhang H., Ciu Q., Sheng N., Yeung L., Guo Y., Sun Y., Dai J. First Report on the Occurrence and Bioa

Date: 4/4/2018

Notes
Study remarks that exposure across gill membranes is a major uptake route.
Study titled as bioaccumulation, but methods indicate bioconcentration. BCFs not provided in a clear manner. Had to decipher from text.
BCF = 3.1 for high test concentration (50 ug/L), BCF = 9.4 for upper end of range recorded for low test concentration (5 ug/L). BCFs reported as "steady state", defined as "when the variation of BCFs in three successive analyses at intervals of >48 h was within +/- 20%".
Study titled as bioconcentration, but fish were wild caught with water samples taken at same location. This would suggest bioaccumulation (water+food).
Study refers to these values as bioconcentration, but fish were wild caught with water samples taken at same location. This would suggest bioaccumulation (water+food). Reported as log BAF. Values here are inverse log.

pounds (PFCs) in zebra mussels (*Dreissena polymorpha*). Environ. Sci. Pollut. Res. (2013) 20:2661-2669.
cal Properties of Perfluorinated Compounds and Their Bioconcentration in Common Carp *Cyprinis carpio* L. Arch. En
of perfluorinated compounds in wild medaka is related to octanol/water partition coefficient. Fundam. Toxicol. Sci
ds in Rainbow Trout (*Oncorhynchus mykiss*). Environmental Toxicology and Chemistry (2003) Vol. 22 No. 1:196-204
ccumulation of Hexafluoropropylene Oxide Trimer Acid: An Emerging Concern. Environ. Sci. Tech. (2017) 15:9553-9

viron. Contam. Toxicol. (2012) 62:672-680
. (2015) Vol. 2, No. 5:201-208.
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560.

PFOS BCF/BAF Summary Table					
Study	Reported BCF	Geomean	BAF	Geomean	Species
Martin et al; 2003	1100 4300 5400	2945.00	ND	ND	*Oncorhynchus mykiss* (rainbow trout)
Fernandez-Sanjuan et al; 2012	1 100 1000	46.42	ND	ND	*Dreissena polymorpha* (zebra mussel)
Inoue et al, 2012	720 1300	967.47	ND	ND	*Cyprinus carpio* (common carp)
Iwabucchi, et al; 2015	ND	ND	5500	5500	*Oryzias latipes* (medaka)
Shi et al; 2015	ND	ND	3.29 3.45	3.37	*Carassius carassius* (crucian carp)
Pan et al; 2017	ND	ND	7200 4500 270	2060.49	*Cyprinus carpio* (common carp)

References

Fernandez-Sanjuan M., Faria M, Lacorte S., Barata C. Bioaccumulation and effects of perfluorinated com

Inoue Y., Hashizume N., Yakata N., Murakami H., Suzuki Y., Kikushima E., Otsuka M. Unique Physiochemi

Iwabuchi K., Senzaki N., Tsuda S., Wantanabe H., Tamura I., Takanobu H., Tatarazako N. Bioconcentration

Martin J., Mabury S., Solomon K., Muir D. Bioconcentration and Tissue Distribution of Perfluorinated Aci

Pan Y., Zhang H., Ciu Q., Sheng N., Yeung L., Guo Y., Sun Y., Dai J. First Report on the Occurrence and Bioa

Shi Y. L., Vestergren R., Zhou Z., Song X. W., Xu L., Liang Y., Cai Y. Q. Tissue distribution and whole body b

Date: 4/4/2018

Notes
Study remarks that exposure across gill membranes is a major uptake route.
Study titled as bioaccumulation, but methods indicate bioconcentration. BCFs not provided in a clear manner. Had to decipher from text.
BCF = 720 for high test concentration (20 ug/L), BCF = 1300 for low test concentration (2 ug/L). BCFs reported as "steady state", defined as "when the variation of BCFs in three successive analyses at intervals of >48 h was within +/- 20%".
Study titled as bioconcentration, but fish were wild caught with water samples taken at same location. This would suggest bioaccumulation (water+food).
BAF values are mean whole body values from two locations.
Study refers to these values as bioconcentration, but fish were wild caught with water samples taken at same location. This would suggest bioaccumulation (water+food). Reported as log BAF. Values here are inverse log.

pounds (PFCs) in zebra mussels (*Dreissena polymorpha*). Environ. Sci. Pollut. Res. (2013) 20:2661-2669.
cal Properties of Perfluorinated Compounds and Their Bioconcentration in Common Carp *Cyprinis carpio* L. Arch. En
of perfluorinated compounds in wild medaka is related to octanol/water partition coefficient. Fundam. Toxicol. Sci
ds in Rainbow Trout (*Oncorhynchus mykiss*). Environmental Toxicology and Chemistry (2003) Vol. 22 No. 1:196-204
ccumulation of Hexafluoropropylene Oxide Trimer Acid: An Emerging Concern. Environ. Sci. Tech. (2017) 15:9553-9
urden of the chlorinated polyfluoroalkyl ether sulfonic acid F-53B in crucian carp (Carassius carassius): Evidence for

viron. Contam. Toxicol. (2012) 62:672-680
. (2015) Vol. 2, No. 5:201-208.
.
560.
a highly bioaccumulative contaminant of emerging concern. Environ. Sci. Technol. 2016, 49 (24), 14156-14165.

To: connie.brower@ncdenr.gov[connie.brower@ncdenr.gov]
Cc: Walker, Mary[walker.mary@epa.gov]; Behl, Betsy[Behl.Betsy@epa.gov]; Manning, Jeff[jeff.manning@ncdenr.gov]; Strong, Jamie[Strong.Jamie@epa.gov]; Mclain, Jennifer[Mclain.Jennifer@epa.gov]; Allenbach, Becky[Allenbach.Becky@epa.gov]
From: Southerland, Elizabeth
Sent: Fri 6/9/2017 6:35:37 PM
Subject: RE: Request for info

Connie, we are all working with ORD and Region 4 to make sure we have the best communication materials on this issue. We are still waiting for ORD input to make sure we have the most up to date info. In the meantime, Becky Allenbach of Region 4 is gathering the info from all sources.

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Friday, June 09, 2017 10:16 AM
To: Southerland, Elizabeth <Southerland.Elizabeth@epa.gov>
Cc: Walker, Mary <walker.mary@epa.gov>; Behl, Betsy <Behl.Betsy@epa.gov>; Manning, Jeff <jeff.manning@ncdenr.gov>; Strong, Jamie <Strong.Jamie@epa.gov>
Subject: RE: Request for info

Thank you so very much for the quick reply. We will be on a call today with reporters representing the Wilmington area. With that said – if we can provide information on what EPA is doing to investigate the GenX chemical, that we be most helpful.

Your attention to this is greatly appreciated.

Connie

From: Southerland, Elizabeth [mailto:Southerland.Elizabeth@epa.gov]
Sent: Friday, June 09, 2017 10:09 AM
To: Brower, Connie <connie.brower@ncdenr.gov>
Cc: Manning, Jeff <jeff.manning@ncdenr.gov>; Walker, Mary <walker.mary@epa.gov>; Behl, Betsy <Behl.Betsy@epa.gov>; Strong, Jamie <Strong.Jamie@epa.gov>
Subject: RE: Request for info

Glad you contacted me! EPA's Office of Research and Development has an effort underway to compile information on all the PFAS compounds. I will forward your email to them in hopes they have already researched GenX. When do you need this information? Is there some pending meeting or event where you would like to present this information?

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Friday, June 09, 2017 10:00 AM
To: Southerland, Elizabeth <Southerland.Elizabeth@epa.gov>
Cc: Manning, Jeff <jeff.manning@ncdenr.gov>
Subject: Request for info

Good morning, Betsy,

North Carolina is a home-base for a Perfluoroalkyl chemical manufacturer in Fayetteville, NC along the Cape Fear River. Recent research by joint investigators from NC State and the US EPA office in NC have detected the presence of "GenX", the trade name for perfluoro-2-propoxypropanoic acid (PFPrOPrA), along with other PFASs in the Cape Fear River. Like other "emerging contaminants", this knowledge has understandably alarmed the downstream water treatment plant and local citizens.

Our attempts to research the toxicity of GenX has provided very limited knowledge. Do you know who might be working on this topic? We wish to provide the best information to the newspapers and citizens, we however, have scarce data to examine.

Any help that you can offer is greatly appreciated.

Regards,
Connie

To: Behl, Betsy[Behl.Betsy@epa.gov]
Cc: Shehee, Mina[mina.shehee@dhhs.nc.gov]; Moore, Zack[zack.moore@dhhs.nc.gov]; Strong, Jamie[Strong.Jamie@epa.gov]
From: Dittman, Elizabeth
Sent: Tue 3/27/2018 8:12:59 PM
Subject: RE: [External] Re: Follow up on GenX BMD call

Betsy,

A follow up call next week would be great. The N.C. DHHS team is available anytime Monday, Tuesday afternoon, and Wednesday after 10:30am if needed.

Thanks,

~Beth

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services

919 707 5906 office
919 870 4807 fax
Beth.Dittman@dhhs.nc.gov

5505 Six Forks Road
1912 Mail Service Center
Raleigh, NC 27699

From: Behl, Betsy <Behl.Betsy@epa.gov>
Sent: Tuesday, March 27, 2018 3:21 PM
To: Dittman, Elizabeth <Beth.Dittman@dhhs.nc.gov>
Cc: Shehee, Mina <mina.shehee@dhhs.nc.gov>; Moore, Zack <zack.moore@dhhs.nc.gov>; Strong, Jamie <Strong.Jamie@epa.gov>
Subject: [External] Re: Follow up on GenX BMD call

Dear Beth, many thanks for sharing this. It's a lot of information and will take us a while to get through, especially given the holiday weekend. Would it be ok to have a follow up call next Monday or Tuesday? If we have questions between now and then we will let you know.

Best, betsy

Sent from my iPhone
On Mar 27, 2018, at 2:34 PM, Dittman, Elizabeth <Beth.Dittman@dhhs.nc.gov> wrote:

> Betsy,
>
> Thank you to you and your team for taking the time to speak with us yesterday about EPA efforts to come up with a

toxicity value for GenX. As we discussed, I have attached here the package of tables (pdf file) of statistically significant endpoints that our staff created in response to the NC Secretaries' Science Advisory Board (SAB). The studies used to create these tables were the repeat oral dose studies submitted by the registrant that were 28 days in length or longer. A member of the SAB met with us last week to advise how we may focus our BMD efforts. This involved going through the prepared tables and discussing each endpoints' relevance and significance, as well as some notes on dosing trends. I summarized notes from that consult in the attached table (excel file). Based on our discussions with the SAB member, each endpoint was ranked, with endpoints marked as "1" being the priority for modeling. The attached table is currently sorted by study, but can easily be sorted by rank. Our next steps are to model these priority endpoints and create a package of BMDLs for SAB review. Any thoughts or guidance your team can provide into further prioritizing endpoints to retain for benchmark dose modeling would be welcome. Let me know if you have any questions.

Thank you,

~Beth

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services

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Raleigh, NC 27699

<image003.png>

<GenX Tox Studies Summary Tables for BMD_final v2 28Feb2018.pdf>
<Summary of endpoint selection for BMD modeling 27March2018 V2.xlsx>

To: Behl, Betsy[Behl.Betsy@epa.gov]
Cc: Shehee, Mina[mina.shehee@dhhs.nc.gov]; Moore, Zack[zack.moore@dhhs.nc.gov]
From: Dittman, Elizabeth
Sent: Tue 3/27/2018 6:33:47 PM
Subject: Follow up on GenX BMD call
GenX Tox Studies Summary Tables for BMD_final v2 28Feb2018.pdf
Summary of endpoint selection for BMD modeling 27March2018 V2.xlsx

Betsy,

Thank you to you and your team for taking the time to speak with us yesterday about EPA efforts to come up with a toxicity value for GenX. As we discussed, I have attached here the package of tables (pdf file) of statistically significant endpoints that our staff created in response to the NC Secretaries' Science Advisory Board (SAB). The studies used to create these tables were the repeat oral dose studies submitted by the registrant that were 28 days in length or longer. A member of the SAB met with us last week to advise how we may focus our BMD efforts. This involved going through the prepared tables and discussing each endpoints' relevance and significance, as well as some notes on dosing trends. I summarized notes from that consult in the attached table (excel file). Based on our discussions with the SAB member, each endpoint was ranked, with endpoints marked as "1" being the priority for modeling. The attached table is currently sorted by study, but can easily be sorted by rank. Our next steps are to model these priority endpoints and create a package of BMDLs for SAB review. Any thoughts or guidance your team can provide into further prioritizing endpoints to retain for benchmark dose modeling would be welcome. Let me know if you have any questions.

Thank you,

~Beth

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services

919 707 5906 office
919 870 4807 fax
Beth.Dittman@dhhs.nc.gov

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1912 Mail Service Center
Raleigh, NC 27699

To: Behl, Betsy[Behl.Betsy@epa.gov]
From: Brower, Connie
Sent: Tue 3/27/2018 5:54:45 PM
Subject: News articles -- just FYI

I will not burden you with millions of these – however, the Fayetteville Observer has been at the forefront of this since it began. I'll be on the call this afternoon –

Connie

GENX
Fayetteville Observer: Public learns of Cape Fear River toxins, 11 years later
Fayetteville Observer: DuPont's C8 leak in Fayetteville spurs fears of health crisis
Fayetteville Observer: Secrets, denials and toxic water: The story behind the GenX crisis
Public Radio East: GenX: CFPUA Sends Final HB 56 Report To Raleigh

To: Behl, Betsy[Behl.Betsy@epa.gov]
From: Holman, Sheila
Sent: Fri 3/23/2018 12:20:43 AM
Subject: Re: [External] RE: NCDEQ Contact for GenX Tox Discussions

Thank you, Betsy. Have a good night.

Sheila Holman
Assistant Secretary for Environment
NCDEQ
1601 Mail Service Center
Raleigh, NC 27699-1601
Phone: (919) 707-8619
Fax: (919) 707-8619
deq.nc.gov

sheila.holman@ncdenr.gov

From: Behl, Betsy <Behl.Betsy@epa.gov>
Sent: Thursday, March 22, 2018 8:02 PM
To: Holman, Sheila
Cc: Mort, Sandra L; Scott, Michael
Subject: [External] RE: NCDEQ Contact for GenX Tox Discussions

Sheila,

Sandy has been invited and materials are attached to the invite. Welcome Sandy!

Cheers, Betsy

From: Holman, Sheila [mailto:sheila.holman@ncdenr.gov]
Sent: Thursday, March 22, 2018 7:54 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Cc: Mort, Sandra L <sandy.mort@ncdenr.gov>; Scott, Michael <michael.scott@ncdenr.gov>
Subject: NCDEQ Contact for GenX Tox Discussions

Betsy,

Thank you for your time on the conference call today. Can you please add Sandy Mort to any discussions you may have

with NCDHHS staff on the subject of EPA's work on the GenX toxicological evaluation. I understand that you have a call scheduled with Mina Shehee and Beth Dittman on Monday, March 26, 2018. Please provide Sandy with the call information. I look forward to working with you.

Sheila

Sheila Holman

Assistant Secretary for Environment

NCDEQ

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Fax: (919) 707-8619

deq.nc.gov

sheila.holman@ncdenr.gov

To: Mort, Sandra L[sandy.mort@ncdenr.gov]
Bcc: Jamie Strong (Strong.Jamie@epa.gov)[Strong.Jamie@epa.gov]
From: Behl, Betsy
Sent: Tue 7/3/2018 7:35:31 PM
Subject: RE: request for GenX RfD process update

The report went to the external peer reviewers last week. In May, other federal agencies requested to be able to review the document before it was sent to peer review so we lost several months. This was a change to how we typically develop health advisories so it was not expected. Our new date for release is late September. That was the date we provided to the NC SAB (as reported in Inside EPA).

Happy 4th to you!!

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Tuesday, July 03, 2018 10:39 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: request for GenX RfD process update

Betsy –
NC DEQ is requesting an update on EPA's process toward developing a GenX RfD. Has the draft report advanced to the Independent External Peer Review step that was projected for June 2018? And, does EPA still anticipate the release of the draft document before September?
Happy 4th!
b/r
Sandy Mort

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
(919) 218-5580 - Mobile
sandy.mort@ncdenr.gov

1601 Mail Service Center
Raleigh, NC 27699-1601

To: Brower, Connie[connie.brower@ncdenr.gov]
From: Behl, Betsy
Sent: Tue 7/3/2018 12:29:56 PM
Subject: RE: Kuraray request to use new material

I will check to see if OPPT has additional info

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Monday, July 02, 2018 3:58 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>; Lavoie, Emma <Lavoie.Emma@epa.gov>; Morris, Jeff <Morris.Jeff@epa.gov>
Cc: Ventaloro, Christopher <christopher.ventaloro@ncdenr.gov>; Flaherty, Bridget <bridget.flaherty@ncdenr.gov>
Subject: FW: Kuraray request to use new material

Jeff, Betsy and Emma,

This request comes to us from a company that is also a part of the Chemours (GenX) facility "industrial complex" in Fayetteville, NC.

Like with GenX, we are somewhat limited in our ability to find the actual studies and to respond to the request from our permitting unit.

Any ideas /Help?

Thanks,
Connie

From: Flaherty, Bridget
Sent: Tuesday, June 26, 2018 11:05 AM
To: Brower, Connie <connie.brower@ncdenr.gov>; Ventaloro, Christopher <christopher.ventaloro@ncdenr.gov>
Subject: RE: Kuraray request to use new material

Still not finding additional tox info in the published literature for 3-GLYCIDOXYPROPYL METHYLDIETHOXYSILANE (CAS# 2897-60-1). The REACH dossier does have a toxicological summary, which seems to be the source of the toxicological information from the attached MSDS.

Link for the REACH dossier:
https://echa.europa.eu/registration-dossier/-/registered-dossier/17529/7/1

From: Rodriguez, Teresa
Sent: Wednesday, June 20, 2018 2:44 PM
To: Brower, Connie <connie.brower@ncdenr.gov>
Subject: Kuraray request to use new material

Connie, we have a request from Kuraray (Chemours tenant) to use a new material for their production. Julie and I went over all the information they sent but would like you to look at the toxicity information before we approve it. I attached the MSDS and a paper they sent. Let me know when you have a few minutes to discuss.
Thanks,
Teresa

To: Brower, Connie[connie.brower@ncdenr.gov]
From: Behl, Betsy
Sent: Wed 6/21/2017 2:56:16 PM
Subject: RE: EPA Statement - they have released today on GenX

Thanks Connie!

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Wednesday, June 21, 2017 10:20 AM
To: Ventaloro, Christopher <christopher.ventaloro@ncdenr.gov>; Manning, Jeff <jeff.manning@ncdenr.gov>; Behl, Betsy <Behl.Betsy@epa.gov>; Southerland, Elizabeth <Southerland.Elizabeth@epa.gov>
Cc: Karoly, Cyndi <cyndi.karoly@ncdenr.gov>; Wrenn, Brian L <brian.wrenn@ncdenr.gov>; Green, Jason <jason.green@ncdenr.gov>; Satterwhite, Dana <dana.satterwhite@ncdenr.gov>; Johnson, Chris <chris.johnson@ncdenr.gov>
Subject: FW: EPA Statement - they have released today on GenX

Just FYI

From: Culpepper, Linda
Sent: Wednesday, June 21, 2017 10:08 AM
To: Shehee, Mina <mina.shehee@dhhs.nc.gov>; 'cmoser@pendercountync.gov' <cmoser@pendercountync.gov>; Cris Harrelson <cris.harrelson@brunswickcountync.gov>; dhoward@bladenco.org; ptarte@nhcgov.com; Moore, Zack <zack.moore@dhhs.nc.gov>; Brower, Connie <connie.brower@ncdenr.gov>
Subject: FW: EPA Statement - they have released today on GenX

Sharing the statement I saw this morning regarding EPA's investigation.

Linda Culpepper
Deputy Director
Division of Water Resources
North Carolina Department of Environmental Quality

1611 Mail Service Center
Phone: 919-707-9014

From: Kritzer, Jamie
Sent: Tuesday, June 20, 2017 6:06 PM
To: Culpepper, Linda <linda.culpepper@ncdenr.gov>; Zimmerman, Jay <jay.zimmerman@ncdenr.gov>; Hairston, Ursula <ursula.hairston@ncdenr.gov>; Holloway, Tracey S <Tracey.Holloway@ncdenr.gov>; Holman, Sheila <sheila.holman@ncdenr.gov>; Kelley, Mary P <Mary.Kelley@ncdenr.gov>; Kritzer, Jamie <jamie.kritzer@ncdenr.gov>; Lance, Kathleen C <kathleen.lance@ncdenr.gov>; Lane, Bill F <Bill.Lane@ncdenr.gov>; Lucey, John D <john.lucey@ncdenr.gov>; Miller, Anderson <anderson.miller@ncdenr.gov>; Mundt, Jennifer <Jennifer.Mundt@ncdenr.gov>; Nicholson, John A. <John.Nicholson@ncdenr.gov>; Regan, Michael S <Michael.Regan@ncdenr.gov>; Webster, Timothy J <timothy.webster@ncdenr.gov>; Akroyd, Cathy R <Cathy.Akroyd@ncdenr.gov>; Goodwin, Larry <larry.goodwin@ncdenr.gov>; Lucas, Jill M <Jill.Lucas@ncdenr.gov>; Marshall, Angela R <angela.marshall@ncdenr.gov>; Moore, Jerome <jerome.moore@ncdenr.gov>; Munger, Bridget <bridget.munger@ncdenr.gov>; Rudolph, Lexi A <lexi.rudolph@ncdenr.gov>; Sink, Marla <Marla.Sink@ncdenr.gov>; Smith, Tricia <tricia.smith@ncdenr.gov>; Tolley, Lisa <lisa.tolley@ncdenr.gov>; Wiggins, Marty <marty.wiggins@ncdenr.gov>; Young, Sarah <sarah.young@ncdenr.gov>
Subject: EPA Statement - they have released today on GenX

EPA Statement 6/20/17

EPA is committed to protecting public health and supporting states and public water systems as the appropriate steps to address the presence of GenX in drinking water are determined.
EPA has initiated an investigation into Chemours' compliance with a 2009 order issued under the Toxic Substances Control Act (TSCA) for the production of GenX. This investigation will allow EPA to determine whether Chemours is in compliance with requirements of the order to control releases to the environment at the Fayetteville, N.C., facility. EPA is also reviewing the additional toxicity data submitted by the company, as required under the consent order, and updating the risk assessment using the additional toxicity data specific to GenX. At the request of the North Carolina Department of Environmental Quality (NCDEQ), EPA has agreed

to perform independent laboratory analysis for GenX in some of the water samples being collected by NCDEQ at 13 locations in the Cape Fear River over the next three weeks.

Background

- Typically, EPA investigates potential TSCA noncompliance through a review of production and environmental controls records required by any rule or order and, as needed, an on-site inspection. EPA may also use information requests to inform our investigation.
- When EPA issued the consent order, the risk assessment for GenX was informed by available toxicity data for GenX and analogous substances such as PFOA (also known as C8). The consent order required the company to conduct additional toxicity testing on GenX.
- EPA has received the data from Chemours and is using it to update its risk assessment.
- Chemours agreed to bear all costs for the water collection and testing. The samples are being sent to a private laboratory in Colorado, and the EPA Office of Research and Development laboratory in Research Triangle Park, NC for independent verification.

NCDEQ believes the completed results will be back from the laboratory in Colorado within four weeks from when the samples are received. EPA is working to determine a timeline for its analysis.

Under the Safe Drinking Water Act, EPA undertakes extensive evaluations of contaminants and uses the best available peer reviewed science to identify and regulate contaminants that present meaningful opportunities for health risk reduction.

The agency is working closely with the states and public water systems to determine the appropriate next steps to ensure public health protection.

Jamie Kritzer
Communications Director
N.C. Department of Environmental Quality
919-707-8602
919-218-5935

Nothing Compares

To: connie.brower@ncdenr.gov[connie.brower@ncdenr.gov]
From: Behl, Betsy
Sent: Tue 10/17/2017 3:40:47 PM
Subject: Re: BAFs / BCFs for perfluorinated compounds

Connie, thanks for the note and reminder. I will look into this and get back to you.

Sent from my iPhone

On Oct 17, 2017, at 10:38 AM, Brower, Connie <connie.brower@ncdenr.gov> wrote:

> Hi Betsy –
>
> We are still working on the issues related to "GenX" PFAAs in the Cape Fear River. It is a challenge, for sure. At the ACWA Vermont meeting you mentioned that you may be able to assist in finding BCFs/ BAFs for the class of compounds, or (hopefully) more specific information on "GenX" itself.
>
> We're you able to find anyone to aid us? Any assistance is useful, as we are trying to be prepared for these questions with respect to potential development of water quality standards.
>
> Regards,
> Connie

To: Mort, Sandra L[sandy.mort@ncdenr.gov]; Joseph.Haney@tceq.texas.gov[Joseph.Haney@tceq.texas.gov]; Strong, Jamie[Strong.Jamie@epa.gov]; Jacobs, Brittany[Jacobs.Brittany@epa.gov]; Brinkerhoff, Chris[Brinkerhoff.Chris@epa.gov]; Gibbons, Catherine[Gibbons.Catherine@epa.gov]; Sasso, Alan[Sasso.Alan@epa.gov]; Thayer, Kris[thayer.kris@epa.gov]; Stern, Alan[Alan.Stern@dep.nj.gov]
Cc: Elizabeth Dittman[Beth.Dittman@dhhs.nc.gov]; james.bateson@ncdenr.gov[james.bateson@ncdenr.gov]; louise.hughes@ncdenr.gov[louise.hughes@ncdenr.gov]
From: Behl, Betsy
Sent: Fri 6/15/2018 5:04:56 PM
Subject: RE: NC Secretaries' SAB meeting presentations on Monday, June 18th
NCSSAB GENX PRESENTATION 6.18.18.pptx

Greetings Sandra,

We did receive the WebEx information for the meeting on Monday. Attached above is the presentation. Dr. Brittany Jacobs, who has been working on this assessment will actually be making this presentation. I will be attending as well along with others from OW and OCSPP in EPA..

Looking Forward,

Betsy

Elizabeth (Betsy) Behl, Director
Health and Ecological Criteria Division, 4304-T
Office of Science and Technology, Office of Water
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington DC 20460

phone: 202.566.0788
room 5233H

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Friday, June 15, 2018 10:28 AM
To: Joseph.Haney@tceq.texas.gov; Behl, Betsy <Behl.Betsy@epa.gov>; Strong, Jamie <Strong.Jamie@epa.gov>; Jacobs, Brittany <jacobs.brittany@epa.gov>; Brinkerhoff, Chris <Brinkerhoff.Chris@epa.gov>; Gibbons, Catherine <Gibbons.Catherine@epa.gov>; Sasso, Alan <Sasso.Alan@epa.gov>; Thayer, Kris <thayer.kris@epa.gov>; Stern, Alan <Alan.Stern@dep.nj.gov>
Cc: Mort, Sandra L <sandy.mort@ncdenr.gov>; Elizabeth Dittman <Beth.Dittman@dhhs.nc.gov>; james.bateson@ncdenr.gov
Subject: NC Secretaries' SAB meeting presentations on Monday, June 18th

All –
I am emailing you to confirm that you received the email yesterday with the WebEx connection information for Monday's (6/18/18) NC Secretaries' Science Advisory Board meeting. Attached is a detailed agenda that identifies the time of your presentations/discussion (in Raleigh NC time, EDT). Just for safety sake, I request that you email me and Louise Hughes (louise.hughes@ncdenr.gov) a copy of your presentation materials if you have not done so already, should we have WebEx issues. If you have any questions, please contact me. You can reach me at anytime at my mobile number (including over the weekend).

THANK YOU ALL
Sandy

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
(919) 218-5580 - Mobile
sandy.mort@ncdenr.gov

1646 Mail Service Center
Raleigh, NC 27699-1646

Development of Toxicity Values for GenX Chemicals

Briefing for North Carolina Secretaries' Science Advisory Board

US EPA

June 18, 2018

Purpose of this Briefing

- Provide North Carolina Secretaries' Science Advisory Board an overview of EPA's analysis and effects characterization of toxicity values for GenX chemicals
  - Assessment led by EPA Office of Water and Office of Pollution Prevention and Toxics

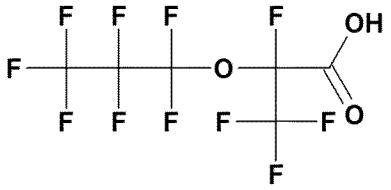
Overall Scientific Objectives

- Provide the health effects information for the development of toxicity values (e.g., oral reference doses) including the science-based decisions supported by relevant studies, effects, and estimated point(s) of departure (POD)

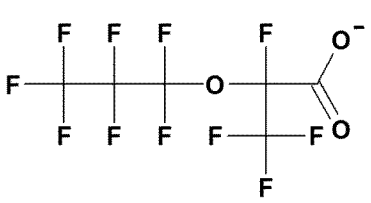
Document Structure

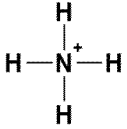
- Background
- Nature of the stressor including occurrence, chemical and physical properties and toxicokinetics
- Problem Formulation, including conceptual model and analysis plan
- Study Synthesis
- Summary of Hazard
- Dose response assessment including modeling, uncertainty factors and derivation of Reference Value(s)
- Characterization of Uncertainties

GenX Chemicals



HFPO dimer acid
CASRN 13252-13-6





HFPO dimer acid, ammonium salt
CASRN 62037-80-3

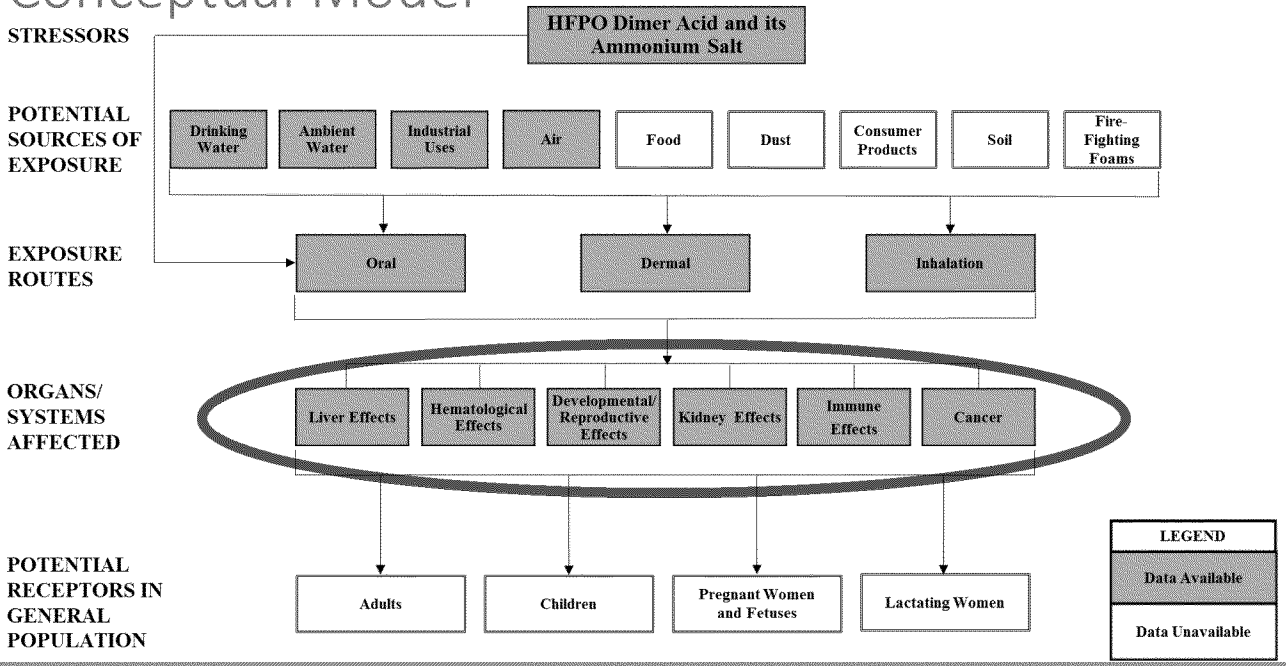
Environmental Fate

- GenX chemicals are stable to photolysis, hydrolysis and biodegradation and are persistent in air, water, soil and sediments.
- Highly soluble
- Low sorption to sediment and soil
  - Potential to rapidly leach to groundwater from soil and landfills.
- Partitioning from surface water to the vapor phase may occur.
  - They may undergo long range atmospheric transport in the vapor phase and be associated with particulate matter.
  - Removal from air may occur by scavenging by water droplets and attachment to particulates followed by precipitation and settling.
- They are not expected to be removed during wastewater treatment or conventional drinking water treatment.
- They have low potential to bioaccumulate in fish.

Occurrence

- Monitoring for GenX chemicals is limited.
  - GenX chemicals were first identified in North Carolina's Cape Fear River and its tributaries in the summer of 2012.
  - Sun et al. (2016) reported detections of GenX chemicals in three drinking water treatment plants treating surface water from the Cape Fear River watershed.
  - Subsequent monitoring by NCDEQ reported GenX chemicals in surface water, groundwater, and finished drinking water in the Cape Fear Watershed close to the Chemours facility where the chemicals were used and 100 miles downstream.
  - GenX chemicals have also been detected in three on-site production wells and one on-site drinking water well at Chemours' Washington Works facility in Parkersburg, West Virginia.
  - GenX chemicals were found in rainwater samples collected between February 28-March 2, 2018 up to 7 miles from the North Carolina plant.
  - EPA's ORD is providing monitoring assistance to North Carolina and New Jersey.

Problem Formulation
Conceptual Model



Study Evaluation for GenX Chemicals

- Many of the available studies were conducted by industry to support new uses and Pre-Manufacturing Notifications and were submitted to the Agency for review.
  - These studies are available through the HERO database: https://hero.epa.gov/hero/index.cfm/project/page/project_id/2627
- Studies were designed and implemented according to OECD Test Guidelines and followed Principles of Good Laboratory Practices.
- EPA evaluated the studies based on Agency Guidelines and criteria to determine if the studies:
  - Adequately describe study protocol and methods
  - Evaluate appropriate endpoints
    - Toxicity depends on the amount, duration, timing and pattern of exposure, and could range from frank effects (e.g., mortality) to subtler biochemical, physiological, pathological or functional changes in multiple organs and tissues.
  - Use appropriate statistical procedures to determine an effect
  - Establish a dose-response relationship (i.e., NOAEL) and/or lowest observed adverse effect level (LOAEL)
  - Have data to identify a POD for a change in the effect considered to be adverse (out of the range of normal biological variability).

Available Studies

Published Peer Reviewed Literature

- 28 day oral toxicity study evaluating hepatotoxic effects in mice (Wang et al., 2016)
- 28 day oral toxicity study evaluating immunomodulatory effects in mice (Rushing et al., 2017)
- 2 studies that are published versions of DuPont/Chemours data:
  - The OECD 453 combined chronic toxicity/oncogenicity study (2 year) in rats (Rae et al., 2015)
  - An oral, single dose pharmacokinetic study describing absorption, distribution, metabolism, and elimination in rats, mice and cynomolgus monkeys (Gannon et al., 2016)

DuPont/Chemours Studies

- Acute oral, dermal, and inhalation toxicity studies
- Toxicokinetic studies
- Genotoxicity studies (in vivo and in vitro)
- Repeated-dose metabolism and pharmacokinetics in rats and mice (OPPTS 870.7485)
- 28 day oral toxicity study in mice and rats (OECD TG 407)
- 90-day toxicity study (OPPTS 870.3100; OECD 408)
- Chronic toxicity/carcinogenicity study in rats (OPPTS 870.4300; OECD 408)
- One-generation reproduction study in mice (OECD 421, modified)

EFFECTS CHARACTERIZATION

28-Day Oral Toxicity Studies (Chemours)

OECD Guideline 407

Mouse

- DuPont 24459
- Dose (gavage):
  - 0, 0, 0.1, 3 and 30 mg/kg/day
- Effects:
  - Liver effects (↑ relative liver weight in both sexes and ↑ hepatocellular hypertrophy in both sexes and single cell necrosis in males)
  - Hematological effects (↓ hemoglobin and hematocrit in males)
  - Immune effects (↓ globulin in females and ↑ A/G ratio in both sexes)
- NOAEL = 0.1 mg/kg/day

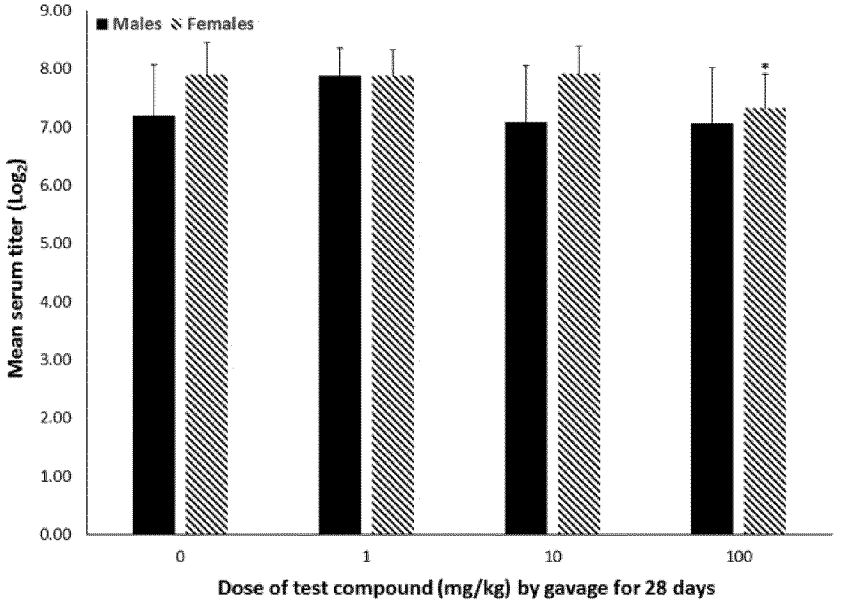
Rat

- DuPont 24447
- Dose (gavage):
  - 0, 0.3, 3 and 30 mg/kg/day (males)
  - 0, 3, 30 and 300 mg/kg/day (females)
- Effects:
  - Liver effects (↑ relative liver weight and hepatocellular hypertrophy in males)
  - Hematological effects (↓ erythrocyte count, hemoglobin, and hematocrit in males)
  - Immune effects (↓ globulin and ↑ A/G ratio in males)
- NOAEL = 0.3 mg/kg/day

28-Day Oral Immunotoxicity Study

Rushing et al., 2017

- C57BL/6 mice
- 0, 1, 10, and 100 mg/kg/day HFPO dimer acid
- Effects:
  - TDAR suppression in females
  - ↑ lymphocytes in males
- NOAEL = 10 mg/kg/day



90-Day Oral Toxicity Studies (Chemours)

OECD Guideline 408

Mouse

- DuPont 18405-1307
- 0, 0.1, 0.5, and 5 mg/kg/day
- Effects:
  - Liver enzyme level changes (↑aspartate aminotransferase, alanine aminotransferase, and alkaline phosphatase) in both sexes
  - ↑ relative liver weight in both sexes
  - ↑ hepatocellular hypertrophy and single cell necrosis in males
- NOAEL = 0.5 mg/kg/day

Rat

- DuPont 17751-1026
- 0, 0.1, 10 and 100 mg/kg/day (males) and 0, 10, 100, and 1000 mg/kg/day (females)
- Effects:
  - ↓ erythrocyte count, hemoglobin, and hematocrit in males
- NOAEL = 0.1 mg/kg/day

2-Year Oral Toxicity/Carcinogenicity Study

OECD Guideline 453

- DuPont 18405-1238
- Crl:CD(SD) rats
- 0, 0.1, 1, and 50 mg/kg/day (males) and 0, 1, 50, and 500 mg/kg/day (females)
- Effects:
  - ↑ liver enzyme levels (alkaline phosphatase, ALT, and SDH) in males
  - ↑ centrilobular hepatocellular hypertrophy and cystic focal degeneration in males
  - ↑ centrilobular necrosis in both sexes
- NOAEL = 1 mg/kg/day

Oral Reproductive/Developmental Toxicity Study

Modified OECD Guideline 421

- DuPont 18405-1037
- Crl:CD1(ICR) mice
- 0, 0.1, 0.5, and 5 mg/kg/day
- Effects:
  - F0- ↑ relative liver weight in both sexes and single cell necrosis in males
  - Offspring- ↓ pup weights and delays in the attainment of balanopreputial separation and vaginal patency
- NOAEL = 0.1 mg/kg/day (F0) and 0.5 mg/kg/day (offspring)

Oral Prenatal and Developmental Screening Study

OECD Guideline 414

- DuPont 18405-841
- 0, 10, 100, and 1000 mg/kg/day
- Effects:
  - ↑ early deliveries and ↓ gravid uterine weight
  - ↓ fetal weights in both sexes
- NOAEL = 10 mg/kg/day (maternal and offspring)

Study	NOAEL (mg/kg/day)	Effects
DuPont 24447: 28-Day Oral (Gavage) Toxicity Study in Rats	NOAEL = 0.3	• Liver effects • Hematological effects • Immune effects
DuPont 24459: 28-Day Oral (Gavage) Toxicity Study in Mice	NOAEL = 0.1	• Liver effects • Hematological effects • Immune effects
Rushing et al. (2017): 28-day Oral (Gavage) Immunotoxicity Study in Mice	NOAEL = 10	• Immune effects
DuPont 17751-1026: 90-Day Oral (Gavage) Toxicity Study in Rats	NOAEL = 0.1	• Hematological effects
DuPont 18405-1307: 90-Day Oral (Gavage) Toxicity Study in Mice	NOAEL = 0.5	• Liver effects
DuPont 18405-1238: Combined Chronic Toxicity/ Oncogenicity Study in Rats	NOAEL = 1	• Liver effects
DuPont 18405-1037 Oral (Gavage) Reproduction/ Developmental Toxicity Screening Study in Mice	NOAEL (F0) = 0.1 NOAEL (offspring) = 0.5	• Liver effects • Developmental effects
DuPont 18405-841 Prenatal and Developmental Toxicity Study in Rats	NOAEL (maternal and offspring) = 10	• Developmental effects

Weight of Evidence for Hazard

- Adverse effects are observed in the liver, developing fetus, and hematological and immune systems.
- The single cancer bioassay show increased liver tumors (females) and combined adenomas and carcinomas pancreatic acinar (males) in rats at the high doses only.
  - There was an increased incidence of testicular interstitial cell adenoma in males, but this increase was not statistically significant.
  - There are no studies measuring cancer endpoints in mice.
- Liver is primary target of toxicity. Effects are observed in both male and female mice and rats at varying durations of exposures and doses and are the endpoints that are observed at the lowest doses of exposure to these chemicals.
  - Use of Hall et al. (2012) criteria for adversity of liver endpoints.
    - Hepatocellular hypertrophy and an increased liver weight are common findings in rodents, but are often considered non-adverse if there is evidence for PPARα activation.
    - These effects were considered adverse when accompanied by necrosis, fibrosis, inflammation, and/or steatosis.

APPROACH FOR DERIVATION OF REFERENCE DOSE

Approach for Dose-Response Assessment

- Follow the general guidelines for risk assessment set forth by the National Research Council (1983) and EPA's *Framework for Human Health Risk Assessment to Inform Decision Making* (2014)
- EPA's *A Review of the Reference Dose and Reference Concentration* (2002) document describes a multi-step approach to dose–response assessment including analysis in the range of observation followed by extrapolation to lower levels.

Selection of Critical Study and Effect

- Studies were evaluated based on duration of exposure, use of a control and two or more doses, and provision of NOAEL and/or LOAEL values.
  - Given the availability of subchronic, chronic and reproductive and developmental toxicity studies indicating effects at lower doses, the 28-day studies were not considered quantitatively.
- From the available subchronic (90 day), chronic (2-year cancer bioassay) and reproductive and developmental toxicity studies, the studies that observed adverse effects at the lowest doses tested are considered in the selection of the critical study for derivation of the RfD.
  - NOAELs for liver effects range from 0.1-1 mg/kg/day
  - NOAEL for hematological effects is 0.1 mg/kg/day

Determination of Point of Departure

Benchmark Dose Modeling

- Use of EPA's *Benchmark Dose Technical Guidance Document* (2012).
  - No biologically based dose-response models are available
- Considerations influencing selection of BMD model endpoints include: available data with dose-response, percent change from controls, adversity of effect, and consistency in effect observed across studies.

Determination of Point of Departure

Allometric scaling

- Use *Recommended Use of Body Weight$^{3/4}$ as the Default Method in Derivation of the Oral Reference Dose* (2011) when applicable.
  - Use of a body weight scaling applied to extrapolate toxicologically equivalent doses of oral doses from adult laboratory animals to adult humans.
  - Addresses some aspects of cross-species extrapolation of toxicokinetic and toxicodynamic processes and affects interspecies uncertainty factor.

Characterization of Uncertainty

Uncertainty factors will be selected in accordance with EPA guidelines considering the following:

- Variations in sensitivity among humans (UF_H)
  - No information to is available to characterize interindividual and age-related variability in the toxicokinetics or toxicodynamics.
- Differences between animals and humans (UF_A)
  - Use of allometric scaling will address some of the toxicokinetic and toxicodynamic aspects
- Duration of exposure in the key study compared to a lifetime of the species studied (UF_S)
- Extrapolation from a LOAEL to a NOAEL (UF_L)
  - When the POD type is a BMDL, the current approach is to address this factor as one of the considerations in selecting a BMR for BMD modeling.

Characterization of Uncertainty (Cont'd)

Completeness of the toxicology database (UF_D)

- There are no data from epidemiological studies in the general population or worker cohorts available for use in evaluating human health effects.
- The database available to EPA assesses numerous endpoints: acute toxicity, metabolism and toxicokinetics, genotoxicity, and systemic toxicity in mice and rats with dosing durations of up to 2 years.
  - Deficiencies in the database include limited developmental toxicity testing and immune studies.

Derivation of RfDs

Next Steps

- Independent External Peer Review (June 2018)

Contacts

- Elizabeth (Betsy) Behl, EPA/OW, Director Health and Ecological Criteria Division in the Office of Science and Technology

  Phone: 202-566-0788

  Email: behl.betsy@epa.gov
- Jamie Strong, Ph.D., EPA/OW, Chief, Human Health Risk Assessment Branch in the Health and Ecological Criteria Division in the Office of Science and Technology

  Phone: 202-566-0056

  Email: strong.jamie@epa.gov

To: Brower, Connie[connie.brower@ncdenr.gov]
Cc: Grzyb, Julie[julie.grzyb@ncdenr.gov]; Manning, Jeff[jeff.manning@ncdenr.gov]; Jamie Strong (Strong.Jamie@epa.gov)[Strong.Jamie@epa.gov]; Tobias, David[Tobias.David@epa.gov]
From: Behl, Betsy
Sent: Tue 12/5/2017 9:51:12 PM
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Connie, please follow up with David Tobias (202.564.8534). David works in the Risk Assessment Division in EPA's Office of Pollution Prevention and Toxics (OPPT). He has data and expertise on bioaccumulation of GenX in fish tissue and is ready to assist you.

Please let me know if you have additional questions

Best, Betsy

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Tuesday, December 05, 2017 3:27 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Cc: Grzyb, Julie <julie.grzyb@ncdenr.gov>; Manning, Jeff <jeff.manning@ncdenr.gov>
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Hi Betsy –

Our Science Advisor Board met yesterday – and yet, again, the subject of BAFs for the perfluorinated compounds (in this case Gen X) came up. Can you provide me with a contact for this question? We are definitely in need of assistance as our NPDES permitting group needs to establish a permit limit, and the citizens really are concerned with consumption of the fish , as Wilmington is a vacation/fishing destination.

Regards,
Connie

From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, October 17, 2017 11:41 AM
To: Brower, Connie <connie.brower@ncdenr.gov>
Subject: [External] Re: BAFs / BCFs for perfluorinated compounds

Connie, thanks for the note and reminder. I will look into this and get back to you.

Sent from my iPhone
On Oct 17, 2017, at 10:38 AM, Brower, Connie <connie.brower@ncdenr.gov> wrote:

> Hi Betsy –
>
> We are still working on the issues related to "GenX" PFAAs in the Cape Fear River. It is a challenge, for sure. At the ACWA Vermont meeting you mentioned that you may be able to assist in finding BCFs/ BAFs for the class of compounds, or (hopefully) more specific information on "GenX" itself.
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> We're you able to find anyone to aid us? Any assistance is useful, as we are trying to be prepared for these questions with respect to potential development of water quality standards.
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> Regards,
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From: Behl, Betsy
Sent: Tue 12/5/2017 8:40:17 PM
Subject: RE: [External] Re: BAFs / BCFs for perfluorinated compounds

Connie, I put into a request to OCSPP to see if they have any data on this. We will also make other inquiries.

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Tuesday, December 05, 2017 3:27 PM
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Cc: Grzyb, Julie <julie.grzyb@ncdenr.gov>; Manning, Jeff <jeff.manning@ncdenr.gov>
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> Connie

To: Mort, Sandra L[sandy.mort@ncdenr.gov]
Cc: Jacobs, Brittany[Jacobs.Brittany@epa.gov]; Brinkerhoff, Chris[Brinkerhoff.Chris@epa.gov]; Jamie Strong (Strong.Jamie@epa.gov)[Strong.Jamie@epa.gov]; Henry, Tala[Henry.Tala@epa.gov]
From: Behl, Betsy
Sent: Tue 6/5/2018 6:51:14 PM
Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

We can do the presentation in about a half hour and allow for 15 minutes of questions. Please invite Jamie Strong, Brittany Jacobs and Chris Brinkerhoff as well as me. Jamie is the overall project lead and Chief of the Human Health Risk Branch in OST. Brittany is one of the leads for the GenX assessment and has made this presentation several times before. Chris, from the TSCA program, is an expert in many things, including BMD modeling.

Best, Betsy

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Tuesday, June 05, 2018 2:40 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

Betsy-
Thank you. I'll accommodate your schedule & let you know a specific time soon. Do you think 30 minutes for your presentation is adequate, or would you need longer – keeping in mind the Science Advisory Bd is made up primarily of toxicologist & a couple of MDs. I would also provide time for questions (10-15 minutes).

We really appreciate your time.
Thanks,
Sandy

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
sandy.mort@ncdenr.gov

1646 Mail Service Center
Raleigh, NC 27699-1646

Nothing Compares

From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, June 5, 2018 2:21 PM
To: Mort, Sandra L <sandy.mort@ncdenr.gov>
Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

We can move most things around, but 9-11 and 2-3 are busy on the 18th.

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Tuesday, June 05, 2018 9:00 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

Betsy,
If that is best for your schedule, we can certainly accommodate that and go the webinar route. I do not have a firm agenda schedule at this time, but the meeting will start at 10am and likely go until 3pm EST. Is there a time during this window that you could not be available?
Sandy

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

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sandy.mort@ncdenr.gov

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From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, June 5, 2018 8:52 AM
To: Mort, Sandra L <sandy.mort@ncdenr.gov>
Subject: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

Sandy, are you open to doing this via webinar? The 18th is right up against an important milestone for the team.

Thanks for your consideration, Betsy

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Friday, June 01, 2018 10:49 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: Invitation to present on EPA's development of PFAS toxicity values

Betsy –
NC DEQ and the NC DHHS and DEQ Secretaries' Science Advisory Board would like to invite you to travel to Raleigh on June 18th to provide an update on the EPA's efforts towards developing toxicity values for GenX and other PFAS. As you know, NC is investigating PFAS contamination in the Cape Fear River, Wilmington NC public drinking water supplies, and local private well waters near the Chemours-Fayetteville. We were thinking the presentation provided to NC DHHS & DEQ staff on 5/10/18 would be informative for the SAB (*Development of Toxicity Values for GenX Chemicals and PFBS*). Any additional information updates that would be available at that time would also be welcome, such as when we might expect release of EPA's GenX and PFBS toxicity values.

Don't hesitate to call me with any questions.
b/r
Sandy Mort

NC Secretaries' SAB https://deq.nc.gov/node/84954

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist

NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
sandy.mort@ncdenr.gov

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From: Behl, Betsy
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Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

Betsy,
If that is best for your schedule, we can certainly accommodate that and go the webinar route. I do not have a firm agenda schedule at this time, but the meeting will start at 10am and likely go until 3pm EST. Is there a time during this window that you could not be available?
Sandy

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
sandy.mort@ncdenr.gov

1646 Mail Service Center
Raleigh, NC 27699-1646

From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, June 5, 2018 8:52 AM
To: Mort, Sandra L <sandy.mort@ncdenr.gov>
Subject: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

Sandy, are you open to doing this via webinar? The 18th is right up against an important milestone for the team.

Thanks for your consideration, Betsy

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Friday, June 01, 2018 10:49 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: Invitation to present on EPA's development of PFAS toxicity values

Betsy –
NC DEQ and the NC DHHS and DEQ Secretaries' Science Advisory Board would like to invite you to travel to Raleigh on June 18th to provide an update on the EPA's efforts towards developing toxicity values for GenX and other PFAS. As you know, NC is investigating PFAS contamination in the Cape Fear River, Wilmington NC public drinking water supplies, and local private well waters near the Chemours-Fayetteville. We were thinking the presentation provided to NC DHHS & DEQ staff on 5/10/18 would be informative for the SAB (*Development of Toxicity Values for GenX Chemicals and PFBS*). Any additional information updates that would be available at that time would also be welcome, such as when we might expect release of EPA's GenX and PFBS toxicity values.

Don't hesitate to call me with any questions.
b/r
Sandy Mort

NC Secretaries' SAB https://deq.nc.gov/node/84954

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
sandy.mort@ncdenr.gov

1646 Mail Service Center
Raleigh, NC 27699-1646

To: Mort, Sandra L[sandy.mort@ncdenr.gov]
From: Behl, Betsy
Sent: Tue 6/5/2018 12:52:19 PM
Subject: RE: Invitation to present on EPA's development of PFAS toxicity values

Sandy, are you open to doing this via webinar? The 18th is right up against an important milestone for the team.

Thanks for your consideration, Betsy

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Friday, June 01, 2018 10:49 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: Invitation to present on EPA's development of PFAS toxicity values

Betsy –
NC DEQ and the NC DHHS and DEQ Secretaries' Science Advisory Board would like to invite you to travel to Raleigh on June 18th to provide an update on the EPA's efforts towards developing toxicity values for GenX and other PFAS. As you know, NC is investigating PFAS contamination in the Cape Fear River, Wilmington NC public drinking water supplies, and local private well waters near the Chemours-Fayetteville. We were thinking the presentation provided to NC DHHS & DEQ staff on 5/10/18 would be informative for the SAB (*Development of Toxicity Values for GenX Chemicals and PFBS*). Any additional information updates that would be available at that time would also be welcome, such as when we might expect release of EPA's GenX and PFBS toxicity values.

Don't hesitate to call me with any questions.
b/r
Sandy Mort

NC Secretaries' SAB https://deq.nc.gov/node/84954

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
sandy.mort@ncdenr.gov

1646 Mail Service Center
Raleigh, NC 27699-1646

Nothing Compares

Cc: Shehee, Mina[mina.shehee@dhhs.nc.gov]; Moore, Zack[zack.moore@dhhs.nc.gov]
To: Elizabeth Dittman[Beth.Dittman@dhhs.nc.gov]
From: Behl, Betsy
Sent: Wed 5/30/2018 2:07:12 PM
Subject: Re: NC DHHS Benchmark Dose Modeling Report

Thanks Beth. Will do

Sent from my iPhone

> On May 30, 2018, at 9:08 AM, Dittman, Elizabeth <Beth.Dittman@dhhs.nc.gov> wrote:
>
> Betsy,
>
> Please see attached for the NC DHHS Benchmark Dose Modeling Report for GenX that was created in response to a request from the North Carolina Secretaries' Science Advisory Board. Please pass along to members of your group who are working on the EPA GenX assessment and may be interested. Do not hesitate to reach out with any questions or concerns. We look forward to continued communication with your group as we move forward addressing the PFAS issue in our state.
>
> Thank you,
>
> ~Beth
>
>
>
> Beth Dittman
> Toxicologist and Public Health Assessor
> Division of Public Health, Occupational and Environmental Epidemiology Branch
> North Carolina Department of Health and Human Services
>
> 919 707 5906 office
> 919 870 4807 fax
> Beth.Dittman@dhhs.nc.gov
>
> 5505 Six Forks Road
> 1912 Mail Service Center
> Raleigh, NC 27699
>
> [NCPH-3PMS-150-100x110]
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> Email correspondence to and from this address is subject to the
> North Carolina Public Records Law and may be disclosed to third parties.
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>
> Twitter<https://twitter.com/ncdhhs> YouTube<https://www.youtube.com/user/ncdhhs>
> Unauthorized disclosure of juvenile, health, legally privileged, or otherwise confidential information, including confidential information relating to an ongoing State procurement effort, is prohibited by law. If you have received this e-mail in error, please notify the sender immediately and delete all records of this e-mail.
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> _____
>
> Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties by an authorized State official. Unauthorized disclosure of juvenile,

health, legally privileged, or otherwise confidential information, including confidential information relating to an ongoing State procurement effort, is prohibited by law. If you have received this email in error, please notify the sender immediately and delete all records of this email.
> <image003.png>
> <NC DHHS BMD Report 26May2018.pdf>

From: Behl, Betsy
Location: DCRoomWest5231M/DC-CCW-OST call in: Conference Line / Ex. 6 onf id: Personal Phone / Ex. 6
Importance: Normal
Subject: coordination with NC
Start Time: Thur 5/10/2018 7:00:00 PM
End Time: Thur 5/10/2018 7:45:00 PM
Required Attendees: Strong, Jamie; Jacobs, Brittany; Miller, Gregory; Beth.Dittman@dhhs.nc.gov; mina.shehee@dhhs.nc.gov

ECOS FED PART GENX PFBS PRESENTATION 4.27.18A.PDF

Provided are links to chemical-specific pages for the studies cited:
GenX: https://hero.epa.gov/hero/index.cfm/project/page/project_id/2627
PFBS: https://hero.epa.gov/hero/index.cfm/project/page/project_id/2610

The above presentation covers both GenX and PFBS. We will only go over the GenX slides.

Please forward to others in NC as appropriate

To: Brower, Connie[connie.brower@ncdenr.gov]
From: Behl, Betsy
Sent: Tue 5/1/2018 8:26:02 PM
Subject: RE: [External] RE: FYI

Thanks Connie!

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Tuesday, May 01, 2018 4:19 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: RE: [External] RE: FYI

Yes – I was there –

She mentioned that they were looking at "all endpoints" (71) to get a range. She did not supply any information with respect to how a recommendation (summarized) would be made to provide the SAB, I get the idea that 71 PODs/RfDs are going to be provided. Target date is the next SAB meeting for release of the numbers.

Link to audio will be here (it may not be loaded through IT security folks yet): https://deq.nc.gov/news/hot-topics/genx-investigation/secretaries-science-advisory-board/science-advisory-board-audio

Discussion on Gen X begins around the 50 minute mark?
Connie

From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, May 01, 2018 8:23 AM
To: Brower, Connie <connie.brower@ncdenr.gov>
Subject: [External] RE: FYI

Thanks Connie. Any idea what was said about BMD modeling for GenX? Who should I contact?

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Friday, April 27, 2018 12:28 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: FYI

https://files.nc.gov/ncdeq/GenX/SAB/SAB%20Agenda%204.30.2018%20FINAL.pdf

To: Brower, Connie[connie.brower@ncdenr.gov]
From: Behl, Betsy
Sent: Tue 5/1/2018 12:23:17 PM
Subject: RE: FYI

Thanks Connie. Any idea what was said about BMD modeling for GenX? Who should I contact?

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Friday, April 27, 2018 12:28 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: FYI

https://files.nc.gov/ncdeq/GenX/SAB/SAB%20Agenda%204.30.2018%20FINAL.pdf

To: connie.brower@ncdenr.gov[connie.brower@ncdenr.gov]
From: Behl, Betsy
Sent: Thur 4/26/2018 2:31:44 PM
Subject: NC SAB meeting

I just got off the phone with Mina Shehee to give her a heads up about the presentation we are developing for GenX and PFBS. Beth Dittman is a the TRAC meeting in Cincinnati this week. Mina said the SAB meeting next week is about chromium 6 and coal ash. There has been no change to the date for the SAB meeting on GenX; it is still in June. Mina said she would give us a heads up if anything changes.

Enjoy the rest of the workshop!!

Elizabeth (Betsy) Behl, Director
Health and Ecological Criteria Division, 4304-T
Office of Science and Technology, Office of Water
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington DC 20460

phone: 202.566.0788
room 5233H

To: Jamie Strong (Strong.Jamie@epa.gov)[Strong.Jamie@epa.gov]; Jacobs, Brittany[Jacobs.Brittany@epa.gov]; Miller, Gregory[Miller.Gregory@epa.gov]; Beth.dittman@dhhs.nc.gov[Beth.dittman@dhhs.nc.gov]; connie.brower@dhhs.nc.gov[connie.brower@dhhs.nc.gov]; mina.shehee@dhhs.nc.gov[mina.shehee@dhhs.nc.gov]; becky.allenbach@dhhs.nc.gov[becky.allenbach@dhhs.nc.gov]; sandy.mort@ncdenr.gov[sandy.mort@ncdenr.gov]
Cc: Pritchett, Jamie R[Jamie.Pritchett@dhhs.nc.gov]; Henry, Tala[Henry.Tala@epa.gov]
From: Behl, Betsy
Sent: Wed 4/4/2018 7:52:51 PM
Subject: Follow up on GenX BMD call

Greetings all!

Our colleagues in OPPT who did the BMD modeling will be able to discuss their approach with you and how they analyzed the model output. They are unfortunately not available until the week of April 15. I am setting up a time for that call.

Looking forward, Betsy

Elizabeth (Betsy) Behl, Director
Health and Ecological Criteria Division, 4304-T
Office of Science and Technology, Office of Water
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington DC 20460

phone: 202.566.0788
room 5233H

To: Elizabeth Dittman[Beth.Dittman@dhhs.nc.gov]
Cc: Shehee, Mina[mina.shehee@dhhs.nc.gov]; Moore, Zack[zack.moore@dhhs.nc.gov]; Strong, Jamie[Strong.Jamie@epa.gov]
From: Behl, Betsy
Sent: Tue 3/27/2018 7:20:49 PM
Subject: Re: Follow up on GenX BMD call

Dear Beth, many thanks for sharing this. It's a lot of information and will take us a while to get through, especially given the holiday weekend. Would it be ok to have a follow up call next Monday or Tuesday? If we have questions between now and then we will let you know.
Best, betsy

Sent from my iPhone

On Mar 27, 2018, at 2:34 PM, Dittman, Elizabeth <Beth.Dittman@dhhs.nc.gov> wrote:

> Betsy,
>
> Thank you to you and your team for taking the time to speak with us yesterday about EPA efforts to come up with a toxicity value for GenX. As we discussed, I have attached here the package of tables (pdf file) of statistically significant endpoints that our staff created in response to the NC Secretaries' Science Advisory Board (SAB). The studies used to create these tables were the repeat oral dose studies submitted by the registrant that were 28 days in length or longer. A member of the SAB met with us last week to advise how we may focus our BMD efforts. This involved going through the prepared tables and discussing each endpoints' relevance and significance, as well as some notes on dosing trends. I summarized notes from that consult in the attached table (excel file). Based on our discussions with the SAB member, each endpoint was ranked, with endpoints marked as "1" being the priority for modeling. The attached table is currently sorted by study, but can easily be sorted by rank. Our next steps are to model these priority endpoints and create a package of BMDLs for SAB review. Any thoughts or guidance your team can provide into further prioritizing endpoints to retain for benchmark dose modeling would be welcome. Let me know if you have any questions.
>
> Thank you,
>
> ~Beth
>
> **Beth Dittman**
> Toxicologist and Public Health Assessor
> Division of Public Health, Occupational and Environmental Epidemiology Branch
> North Carolina Department of Health and Human Services
>
> 919 707 5906 office
> 919 870 4807 fax
> Beth.Dittman@dhhs.nc.gov
>
> 5505 Six Forks Road
> 1912 Mail Service Center
> Raleigh, NC 27699
>
> <image003.png>
>
>

<GenX Tox Studies Summary Tables for BMD_final v2 28Feb2018.pdf>

<Summary of endpoint selection for BMD modeling 27March2018 V2.xlsx>

To: Brower, Connie[connie.brower@ncdenr.gov]
From: Behl, Betsy
Sent: Mon 3/26/2018 8:28:20 PM
Subject: RE: Link to the NC SAB work

Thanks for sharing this!

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Monday, March 26, 2018 9:48 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: Link to the NC SAB work

https://deq.nc.gov/news/hot-topics/genx-investigation/secretaries-science-advisory-board

interesting letter from Shea in last week's meeting notes. It appears that the SAB did not speak of it – but, added it to the web page. He works for Chemours

-c-

From: Behl, Betsy

Location: CALL IN Conference Line / Ex. 6 CONF ID: Personal Phone / Ex. 6

Importance: Normal

Subject: discuss GenX project

Start Time: Mon 3/26/2018 2:00:00 PM

End Time: Mon 3/26/2018 3:00:00 PM

Required Attendees: mina.shehee@dhhs.nc.gov; Beth.Dittman@dhhs.nc.gov; sandy.mort@ncdenr.gov; connie.brower@ncdenr.gov

Optional Attendees: Pritchett, Jamie R

ECOS FED PART GENX PFBS PRESENTATION 03 06 18.pptx

GENX BIBLIO 03 02 18.docx

Looking forward to our conversation on Monday. I have attached above the problem formulation for GenX and our bibliography that we shared with a state group identified by ECOS for us to coordinate with.

Best, Betsy

To: Brower, Connie[connie.brower@ncdenr.gov]
From: Behl, Betsy
Sent: Fri 3/23/2018 1:04:55 PM
Subject: RE: NCDEQ Contact for GenX Tox Discussions

Connie, this happened very quickly yesterday. You are on my list to call about it today. Sorry for the overlap. Will give you a call in a few

---

From: Brower, Connie [mailto:connie.brower@ncdenr.gov]
Sent: Friday, March 23, 2018 8:50 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: FW: NCDEQ Contact for GenX Tox Discussions

???????????? :-)

From: Culpepper, Linda
Sent: Thursday, March 22, 2018 9:52 PM
To: Holman, Sheila <sheila.holman@ncdenr.gov>; Manning, Jeff <jeff.manning@ncdenr.gov>; Brower, Connie <connie.brower@ncdenr.gov>
Cc: Manning, Jeff <jeff.manning@ncdenr.gov>; Fransen, Tom <tom.fransen@ncdenr.gov>
Subject: Re: NCDEQ Contact for GenX Tox Discussions

Jeff & Connie - I would like to have either Connie, Chris or Bridgette on the calls. Who do you want me to ask Betsy to include in the emails for the calls along with Sandy?

Sent from my iPhone
On Mar 22, 2018, at 7:55 PM, Holman, Sheila <sheila.holman@ncdenr.gov> wrote:

> Linda,
>
> Is there anyone else that should be part of these ongoing discussions?
>
> Sheila
>
> Sheila Holman
> Assistant Secretary for Environment
> NCDEQ
> 1601 Mail Service Center
> Raleigh, NC 27699-1601
> Phone: (919) 707-8619
> Fax: (919) 707-8619
> deq.nc.gov
>
> sheila.holman@ncdenr.gov
>
> **********
> Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties unless the content is exempt by statue or other regulation.
> **********

From: Holman, Sheila
Sent: Thursday, March 22, 2018 7:53 PM
To: Behl, Betsy
Cc: Mort, Sandra L; Scott, Michael
Subject: NCDEQ Contact for GenX Tox Discussions

Betsy,

Thank you for your time on the conference call today. Can you please add Sandy Mort to any discussions you may have with NCDHHS staff on the subject of EPA's work on the GenX toxicological evaluation. I understand that you have a call scheduled with Mina Shehee and Beth Dittman on Monday, March 26, 2018. Please provide Sandy with the call information. I look forward to working with you.

Sheila

Sheila Holman
Assistant Secretary for Environment
NCDEQ
1601 Mail Service Center
Raleigh, NC 27699-1601
Phone: (919) 707-8619
Fax: (919) 707-8619
deq.nc.gov

sheila.holman@ncdenr.gov

To: Holman, Sheila[sheila.holman@ncdenr.gov]
Cc: sandy.mort@ncdenr.gov[sandy.mort@ncdenr.gov]; michael.scott@ncdenr.gov[michael.scott@ncdenr.gov]
Bcc: Grevatt, Peter[Grevatt.Peter@epa.gov]
From: Behl, Betsy
Sent: Fri 3/23/2018 12:02:40 AM
Subject: RE: NCDEQ Contact for GenX Tox Discussions

Sheila,
Sandy has been invited and materials are attached to the invite. Welcome Sandy!

Cheers, Betsy

From: Holman, Sheila [mailto:sheila.holman@ncdenr.gov]
Sent: Thursday, March 22, 2018 7:54 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Cc: Mort, Sandra L <sandy.mort@ncdenr.gov>; Scott, Michael <michael.scott@ncdenr.gov>
Subject: NCDEQ Contact for GenX Tox Discussions

Betsy,

Thank you for your time on the conference call today. Can you please add Sandy Mort to any discussions you may have with NCDHHS staff on the subject of EPA's work on the GenX toxicological evaluation. I understand that you have a call scheduled with Mina Shehee and Beth Dittman on Monday, March 26, 2018. Please provide Sandy with the call information. I look forward to working with you.

Sheila

Sheila Holman
Assistant Secretary for Environment
NCDEQ
1601 Mail Service Center
Raleigh, NC 27699-1601
Phone: (919) 707-8619
Fax: (919) 707-8619
deq.nc.gov

sheila.holman@ncdenr.gov

From: Behl, Betsy
Location: CALL IN Conference Line / Ex. 6 ONF ID: Personal Phone / Ex. 6
Importance: Normal
Subject: discuss GenX project
Start Time: Mon 3/26/2018 2:00:00 PM
End Time: Mon 3/26/2018 3:00:00 PM
Required Attendees: sandy.mort@ncdenr.gov
Optional Attendees: Mitchell, Ken; Adams, Glenn

ECOS FED PART GENX PFBS PRESENTATION 03 06 18.pptx

GENX BIBLIO 03 02 18.docx

Looking forward to our conversation on Monday. I have attached above the problem formulation for GenX and our bibliography that we shared with a state group identified by ECOS for us to coordinate with.

Best, Betsy

From: Behl, Betsy
Location: CALL IN: Conference Line / Ex. 6 CONF ID: Personal Phone / Ex. 6
Importance: Normal
Subject: discuss GenX project
Start Time: Mon 3/26/2018 2:00:00 PM
End Time: Mon 3/26/2018 3:00:00 PM
Required Attendees: mina.shehee@dhhs.nc.gov; Beth.Dittman@dhhs.nc.gov; Strong, Jamie
Optional Attendees: Gillespie, Andrew

ECOS FED PART GENX PFBS PRESENTATION 03 06 18.pptx

GENX BIBLIO 03 02 18.docx

Looking forward to our conversation on Monday. I have attached above the problem formulation for GenX and our bibliography that we shared with a state group identified by ECOS for us to coordinate with.

Best, Betsy

Organizer: Dittman, Elizabeth[Beth.Dittman@dhhs.nc.gov]

From: Dittman, Elizabeth

Location: Conference Line / Ex. 6 (passcode Personal Phone / Ex. 6

Importance: Normal

Subject: Follow up call with NC DHHS re: PFECAs and PFAS

Start Time: Tue 3/27/2018 7:00:00 PM

End Time: Tue 3/27/2018 8:00:00 PM

Required Attendees: Suzanne.fenton@nih.gov; Flowers, Lynn; Gloria.post@dep.nj.gov; Pritchett, Jamie R; Shehee, Mina; Moore, Zack; Mort, Sandra L; Henry, Audra E. (ATSDR/DCHI/WB); idz7@cdc.gov; Chou, Selene (ATSDR/DTHHS/ETB); Scinicariello, Franco (ATSDR/DTHHS/ETB); Benson, Amy; Lau, Chris; Strynar, Mark; Lindstrom, Andrew; Allenbach, Becky; Behl, Betsy; Patlewicz, Grace; Henry, Tala; Decker, John A. (CDC/ONDIEH/NCEH); Birnbaum, Linda (NIH/NIEHS) [E]; Blystone, Chad (NIH/NIEHS) [E]; Devito, Michael (NIH/NIEHS) [E]; bucher@niehs.nih.gov; Auerbach, Scott S (NIH/NIEHS) [E]; Maddaloni, Mark; Evangelista, Pat; Azzam, Nidal; Foster, Stiven; Crofton, Kevin; Sinks, Tom; Raffaele, Kathleen; Huff, Lisa; connie.brower@ncdenr.gov; Scott, Michael; Strong, Jamie

All –

Your input and expertise has been crucial for N.C. in our response to GenX and other emerging PFAS in the state. We last had a group call with federal partners on October 11 regarding the important work going on at the federal level to better understand these compounds and their potential health effects, as well as how to address exposure to PFAS mixtures. I would like to schedule a follow up call. The focus of the call will be to hear updates on the various projects that each group is working on to help fill the knowledge gaps surrounding PFECAs and PFAS. I have scheduled a call for **Tuesday March 27 at 3:00PM**. The call-in number **is** Conference Line / Ex. 6 **passcode** Personal Phone / Ex. 6 hope you can join us. Please forward this invitation to folks in your organization that I may have missed.

Thank you all for your time and expertise.

~Beth Dittman

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services
919 707 5906 office
919 870 4807 fax
Beth.Dittman@dhhs.nc.gov
5505 Six Forks Road
1912 Mail Service Center
Raleigh, NC 27699

From: Risen, Amy J

Location: Conference Call

Importance: Normal

Subject: GenX Knowledge Gaps

Start Time: Thur 7/6/2017 7:00:00 PM

End Time: Thur 7/6/2017 8:00:00 PM

Required Attendees: Mort, Sandra L; Elizabeth Dittman; Holt, Kennedy; Shehee, Mina; Langley, Rick; Audra Henry; Wheeler, John; Mitchell, Ken; Behl, Betsy; Strong, Jamie; Henry, Tala; Behrsing, Tracy; Benson, Amy; Aubee, Catherine; Kemker, Carol; Allenbach, Becky; Doa, Maria; Tina Forrester; Susan Moore; Selene Chou; Trent LeCoultre; idz7@cdc.gov; connie.brower@ncdenr.gov

Please call 7 Conference Line / Ex. 6
Code Personal Phone / Ex. 6

From: Dittman, Elizabeth
Location: Conference Line / Ex. 6 (passcode Personal Phone / Ex. 6
Importance: Normal
Subject: Follow up call with NC DHHS re: PFECAs and PFAS
Start Time: Tue 3/27/2018 7:00:00 PM
End Time: Tue 3/27/2018 8:00:00 PM
Required Attendees: Suzanne.fenton@nih.gov; Flowers, Lynn; Gloria.post@dep.nj.gov; Pritchett, Jamie R; Shehee, Mina; Moore, Zack; Mort, Sandra L; Henry, Audra E. (ATSDR/DCHI/WB); idz7@cdc.gov; Chou, Selene (ATSDR/DTHHS/ETB); Scinicariello, Franco (ATSDR/DTHHS/ETB); Benson, Amy; Lau, Chris; Strynar, Mark; Lindstrom, Andrew; Allenbach, Becky; Behl, Betsy; Patlewicz, Grace; Henry, Tala; Decker, John A. (CDC/ONDIEH/NCEH); Birnbaum, Linda (NIH/NIEHS) [E]; Blystone, Chad (NIH/NIEHS) [E]; Devito, Michael (NIH/NIEHS) [E]; bucher@niehs.nih.gov; Auerbach, Scott S (NIH/NIEHS) [E]; Maddaloni, Mark; Evangelista, Pat; Azzam, Nidal; Foster, Stiven; Crofton, Kevin; Sinks, Tom; Raffaele, Kathleen; Huff, Lisa; connie.brower@ncdenr.gov; Scott, Michael; Strong, Jamie

All –
Your input and expertise has been crucial for N.C. in our response to GenX and other emerging PFAS in the state. We last had a group call with federal partners on October 11 regarding the important work going on at the federal level to better understand these compounds and their potential health effects, as well as how to address exposure to PFAS mixtures. I would like to schedule a follow up call. The focus of the call will be to hear updates on the various projects that each group is working on to help fill the knowledge gaps surrounding PFECAs and PFAS. I have scheduled a call for **Tuesday March 27 at 3:00PM**. The call-in number **is** Conference Line / Ex. 6 **passcode** Personal Phone / Ex. 6 I hope you can join us. Please forward this invitation to folks in your organization that I may have missed.
Thank you all for your time and expertise.
~Beth Dittman

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services
919 707 5906 office
919 870 4807 fax
Beth.Dittman@dhhs.nc.gov
5505 Six Forks Road
1912 Mail Service Center
Raleigh, NC 27699

To: Behl, Betsy[Behl.Betsy@epa.gov]
Cc: Jacobs, Brittany[jacobs.brittany@epa.gov]; Brinkerhoff, Chris[Brinkerhoff.Chris@epa.gov]; Strong, Jamie[Strong.Jamie@epa.gov]; Henry, Tala[Henry.Tala@epa.gov]
From: Mort, Sandra L
Sent: Fri 6/8/2018 7:50:26 PM
Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

Betsy –
Just want to keep you all informed --- We are still working on the final agenda timing for the NC Science Advisory Board meeting on Monday, June 18th, but we tentatively have you scheduled for 11am to give a video update on the IRIS review for GenX and PFBS.

Thanks all,
Sandy Mort

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

(919) 707-8217 - Direct Line & Fax
sandy.mort@ncdenr.gov

1646 Mail Service Center
Raleigh, NC 27699-1646

From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, June 5, 2018 2:51 PM
To: Mort, Sandra L <sandy.mort@ncdenr.gov>
Cc: Jacobs, Brittany <jacobs.brittany@epa.gov>; Brinkerhoff, Chris <Brinkerhoff.Chris@epa.gov>; Strong, Jamie <Strong.Jamie@epa.gov>; Henry, Tala <Henry.Tala@epa.gov>
Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

We can do the presentation in about a half hour and allow for 15 minutes of questions. Please invite Jamie Strong, Brittany Jacobs and Chris Brinkerhoff as well as me. Jamie is the overall project lead and Chief of the Human Health Risk Branch in OST. Brittany is one of the leads for the GenX assessment and has made this presentation several times before. Chris, from the TSCA program, is an expert in many things, including BMD modeling.

Best, Betsy

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Tuesday, June 05, 2018 2:40 PM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

Betsy-
Thank you. I'll accommodate your schedule & let you know a specific time soon. Do you think 30 minutes for your presentation is adequate, or would you need longer – keeping in mind the Science Advisory Bd is made up primarily of toxicologist & a couple of MDs. I would also provide time for questions (10-15 minutes).

We really appreciate your time.
Thanks,

Sandy

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

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From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, June 5, 2018 2:21 PM
To: Mort, Sandra L <sandy.mort@ncdenr.gov>
Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

We can move most things around, but 9-11 and 2-3 are busy on the 18th.

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Tuesday, June 05, 2018 9:00 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: RE: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

Betsy,
If that is best for your schedule, we can certainly accommodate that and go the webinar route. I do not have a firm agenda schedule at this time, but the meeting will start at 10am and likely go until 3pm EST. Is there a time during this window that you could not be available?
Sandy

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

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Raleigh, NC 27699-1646

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From: Behl, Betsy [mailto:Behl.Betsy@epa.gov]
Sent: Tuesday, June 5, 2018 8:52 AM

To: Mort, Sandra L <sandy.mort@ncdenr.gov>
Subject: [External] RE: Invitation to present on EPA's development of PFAS toxicity values

Sandy, are you open to doing this via webinar? The 18th is right up against an important milestone for the team.

Thanks for your consideration, Betsy

From: Mort, Sandra L [mailto:sandy.mort@ncdenr.gov]
Sent: Friday, June 01, 2018 10:49 AM
To: Behl, Betsy <Behl.Betsy@epa.gov>
Subject: Invitation to present on EPA's development of PFAS toxicity values

Betsy –
NC DEQ and the NC DHHS and DEQ Secretaries' Science Advisory Board would like to invite you to travel to Raleigh on June 18th to provide an update on the EPA's efforts towards developing toxicity values for GenX and other PFAS. As you know, NC is investigating PFAS contamination in the Cape Fear River, Wilmington NC public drinking water supplies, and local private well waters near the Chemours-Fayetteville. We were thinking the presentation provided to NC DHHS & DEQ staff on 5/10/18 would be informative for the SAB (*Development of Toxicity Values for GenX Chemicals and PFBS*). Any additional information updates that would be available at that time would also be welcome, such as when we might expect release of EPA's GenX and PFBS toxicity values.

Don't hesitate to call me with any questions.
b/r
Sandy Mort

NC Secretaries' SAB https://deq.nc.gov/node/84954

Sandy Mort, M.S., Ph.D.
Environmental Toxicologist
NC Department of Environmental Quality

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sandy.mort@ncdenr.gov

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Raleigh, NC 27699-1646

Nothing Compares

Organizer: Behl, Betsy[Behl.Betsy@epa.gov]
From: Behl, Betsy
Location: DCRoomWest5231M/DC-CCW-OST call in: Conference Line / Ex. 6 conf id: 1 Personal Phone / Ex. 6
Importance: Normal
Subject: FW: coordination with NC
Start Time: Thur 5/10/2018 7:00:00 PM
End Time: Thur 5/10/2018 7:45:00 PM
Required Attendees: Strong, Jamie; Jacobs, Brittany; Miller, Gregory; Beth.Dittman@dhhs.nc.gov; mina.shehee@dhhs.nc.gov
Optional Attendees: Pritchett, Jamie R; Flaherty, Colleen; Mort, Sandra L; Moore, Zack
ECOS FED PART GENX PFBS PRESENTATION 4.27.18A.PDF

-----Original Appointment-----
From: Behl, Betsy
Sent: Tuesday, May 01, 2018 4:23 PM
To: Behl, Betsy; Strong, Jamie; Jacobs, Brittany; Miller, Gregory; Elizabeth Dittman; mina.shehee@dhhs.nc.gov
Cc: Pritchett, Jamie R; Flaherty, Colleen; Mort, Sandra L; Moore, Zack
Subject: coordination with NC
When: Thursday, May 10, 2018 3:00 PM-3:45 PM (UTC-05:00) Eastern Time (US & Canada).
Where: DCRoomWest5231M/DC-CCW-OST call in: Conference Line / Ex. 6 conf id: Personal Phone / Ex. 6

Provided are links to chemical-specific pages for the studies cited:
GenX: https://hero.epa.gov/hero/index.cfm/project/page/project_id/2627
PFBS: https://hero.epa.gov/hero/index.cfm/project/page/project_id/2610

The above presentation covers both GenX and PFBS. We will only go over the GenX slides.

Please forward to others in NC as appropriate

Organizer: Behl, Betsy[Behl.Betsy@epa.gov]
From: Behl, Betsy
Location: DCRoomWest5231M/DC-CCW-OST call in: Conference Line / Ex. 6 conf id: Personal Phone / Ex. 6
Importance: Normal
Subject: FW: coordination with NC
Start Time: Thur 5/10/2018 1:00:00 PM
End Time: Thur 5/10/2018 1:30:00 PM
Required Attendees: Strong, Jamie; Jacobs, Brittany; Miller, Gregory; Beth.Dittman@dhhs.nc.gov; mina.shehee@dhhs.nc.gov
Optional Attendees: Pritchett, Jamie R; Flaherty, Colleen; Mort, Sandra L; Moore, Zack
ECOS FED PART GENX PFBS PRESENTATION 4.27.18A.PDF

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Provided are links to chemical-specific pages for the studies cited:
GenX: https://hero.epa.gov/hero/index.cfm/project/page/project_id/2627
PFBS: https://hero.epa.gov/hero/index.cfm/project/page/project_id/2610

The above presentation covers both GenX and PFBS. We will only go over the GenX slides.

Please forward to others in NC as appropriate

To: Elizabeth Dittman[Beth.Dittman@dhhs.nc.gov]; mina.shehee@dhhs.nc.gov[mina.shehee@dhhs.nc.gov]
Cc: Snowden, Belinda[snowden.belinda@epa.gov]; Strong, Jamie[Strong.Jamie@epa.gov]; Flaherty, Colleen[Flaherty.Colleen@epa.gov]
From: Behl, Betsy
Sent: Thur 4/26/2018 2:51:09 PM
Subject: continuing conversation on GenX

Greetings Beth and Mina,

We are planning to send you all a copy of the presentation we are developing on GenX tomorrow. This presentation describes the studies we reviewed and outlines our approach for developing the toxicity values. We plan to send the draft document to external peer review the second week in May and will share peer reviewer comments with you, other states, and federal stakeholder groups when we get the peer review report in June. I would like to set up our next discussion with you on or after May 8th.Please let me know when you would like to arrange a call. My scheduler Belinda Snowden will be happy to set up the meeting. I will be out of the office at that time but my Deputy Division Director, Colleen Flaherty, and Jamie Strong will be able to have a conversation with you to address questions you have on the presentation.

Best,
Betsy

Elizabeth (Betsy) Behl, Director
Health and Ecological Criteria Division, 4304-T
Office of Science and Technology, Office of Water
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington DC 20460

phone: 202.566.0788
room 5233H

Organizer:	Elizabeth Dittman[Beth.Dittman@dhhs.nc.gov]
From:	Elizabeth Dittman
Location:	Conference Line / Ex. 6 passcode Personal Phone / Ex. 6
Importance:	Normal
Subject:	FW: Follow up call with NC DHHS re: PFECAs and PFAS
Start Time:	Tue 3/27/2018 7:00:00 PM
End Time:	Tue 3/27/2018 8:00:00 PM
Required Attendees:	linda.culpepper@ncdenr.gov; Holsinger, Hannah; Grevatt, Peter; Hall, Renea; Gillespie, Andrew; Suzanne.fenton@nih.gov; Flowers, Lynn; Gloria.post@dep.nj.gov; Pritchett, Jamie R; Shehee, Mina; Moore, Zack; Mort, Sandra L; Henry, Audra E. (ATSDR/DCHI/WB); idz7@cdc.gov; Chou, Selene (ATSDR/DTHHS/ETB); Scinicariello, Franco (ATSDR/DTHHS/ETB); Benson, Amy; Lau, Chris; Strynar, Mark; Lindstrom, Andrew; Allenbach, Becky; Behl, Betsy; Patlewicz, Grace; Henry, Tala; Decker, John A. (CDC/ONDIEH/NCEH); Birnbaum, Linda (NIH/NIEHS) [E]; Blystone, Chad (NIH/NIEHS) [E]; Devito, Michael (NIH/NIEHS) [E]; bucher@niehs.nih.gov; Auerbach, Scott S (NIH/NIEHS) [E]; Maddaloni, Mark; Evangelista, Pat; Azzam, Nidal; Foster, Stiven; Crofton, Kevin; Sinks, Tom; Raffaele, Kathleen; Huff, Lisa; connie.brower@ncdenr.gov; Scott, Michael; Strong, Jamie

image003.png

From: Dittman, Elizabeth
Sent: Monday, February 26, 2018 8:12:49 PM UTC
To: Dittman, Elizabeth; Suzanne.fenton@nih.gov; Flowers, Lynn; Gloria.post@dep.nj.gov; Pritchett, Jamie R; Shehee, Mina; Moore, Zack; Mort, Sandra L; Henry, Audra E. (ATSDR/DCHI/WB); idz7@cdc.gov; Chou, Selene (ATSDR/DTHHS/ETB); Scinicariello, Franco (ATSDR/DTHHS/ETB); Benson, Amy; Lau, Chris; Strynar, Mark; Lindstrom, Andrew; Allenbach, Becky; Behl, Betsy; Patlewicz, Grace; Henry, Tala; Decker, John A. (CDC/ONDIEH/NCEH); Birnbaum, Linda (NIH/NIEHS) [E]; Blystone, Chad (NIH/NIEHS) [E]; Devito, Michael (NIH/NIEHS) [E]; bucher@niehs.nih.gov; Auerbach, Scott S (NIH/NIEHS) [E]; Maddaloni, Mark; Evangelista, Pat; Azzam, Nidal; Foster, Stiven; Crofton, Kevin; Sinks, Tom; Raffaele, Kathleen; Huff, Lisa; connie.brower@ncdenr.gov; Scott, Michael; Strong, Jamie
Subject: Follow up call with NC DHHS re: PFECAs and PFAS
When: Tuesday, March 27, 2018 7:00 PM-8:00 PM.
Where: Conference Line / Ex. 6 (passcode Personal Phone / Ex. 6

All –

Your input and expertise has been crucial for N.C. in our response to GenX and other emerging PFAS in the state. We last had a group call with federal partners on October 11 regarding the important work going on at the federal level to better understand these compounds and their potential health effects, as well as how to address exposure to PFAS mixtures. I would like to schedule a follow up call. The focus of the call will be to hear updates on the various projects that each group is working on to help fill the knowledge gaps surrounding PFECAs and PFAS. I have scheduled a call for Tuesday March 27 at 3:00PM. The call-in number is Conference Line / Ex. 6 (passcode Personal Phone / Ex. 6 I hope you can join us. Please forward this invitation to folks in your organization that I may have missed.

Thank you all for your time and expertise.

~Beth Dittman

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services

919 707 5906 office
919 870 4807 fax
Beth.Dittman@dhhs.nc.gov<mailto:Beth.Dittman@dhhs.nc.gov>

5505 Six Forks Road
1912 Mail Service Center
Raleigh, NC 27699

From:	Allenbach, Becky
Location:	Conference Line / Ex. 6 (passcode Personal Phone / Ex. 6
Importance:	Normal
Subject:	FW: Follow up call with NC DHHS re: PFECAs and PFAS
Start Time:	Tue 3/27/2018 7:00:00 PM
End Time:	Tue 3/27/2018 8:00:00 PM
Required Attendees:	linda.culpepper@ncdenr.gov; Holsinger, Hannah; Grevatt, Peter; Hall, Renea; Gillespie, Andrew

image003.png

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Sent: Monday, February 26, 2018 8:12:49 PM UTC
To: Dittman, Elizabeth; Suzanne.fenton@nih.gov; Flowers, Lynn; Gloria.post@dep.nj.gov; Pritchett, Jamie R; Shehee, Mina; Moore, Zack; Mort, Sandra L; Henry, Audra E. (ATSDR/DCHI/WB); idz7@cdc.gov; Chou, Selene (ATSDR/DTHHS/ETB); Scinicariello, Franco (ATSDR/DTHHS/ETB); Benson, Amy; Lau, Chris; Strynar, Mark; Lindstrom, Andrew; Allenbach, Becky; Behl, Betsy; Patlewicz, Grace; Henry, Tala; Decker, John A. (CDC/ONDIEH/NCEH); Birnbaum, Linda (NIH/NIEHS) [E]; Blystone, Chad (NIH/NIEHS) [E]; Devito, Michael (NIH/NIEHS) [E]; bucher@niehs.nih.gov; Auerbach, Scott S (NIH/NIEHS) [E]; Maddaloni, Mark; Evangelista, Pat; Azzam, Nidal; Foster, Stiven; Crofton, Kevin; Sinks, Tom; Raffaele, Kathleen; Huff, Lisa; connie.brower@ncdenr.gov; Scott, Michael; Strong, Jamie
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~Beth Dittman

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Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services

919 707 5906 office
919 870 4807 fax

Beth.Dittman@dhhs.nc.gov<mailto:Beth.Dittman@dhhs.nc.gov>

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Raleigh, NC 27699

Chemours Fayetteville Works -
Further Stack Testing Plan and Tentative Schedule

HFPO Dimer Acid

- **Week of March 19** — Perform further stack testing for emissions of HFPO Dimer Acid from the IXM Polymers, Division and Semi-Works stacks.

HFPO Monomer

- **March 20** — Provide draft stack testing protocol to DAQ.
- **Week of April 2** — Target for stack testing at VE South and Division stacks. If issues are encountered during testing, these tests will be considered "Shakedown", and the tests will be repeated during the **week of April 23**.

E-1

- **April 13** — Provide draft stack testing protocol to DAQ (note: Chemours is working through issues regarding the potential interference by HFPO Dimer Acid with the standard purge and trap method).
- **Weeks of May 14 or 21** — Target for stack testing of IXM Polymers, Semi-Works and MMF stacks.

Byproducts 1 and 2

- **Week of April 16** — Chemours will complete ongoing spike testing in the lab and study recovery on the XAD-2 resin to determine if the current HFPO Dimer method is appropriate for Byproducts 1 and 2 as well. If determined appropriate, Chemours will have existing stack test samples analyzed for Byproducts 1 and 2. If determined not appropriate, Chemours will develop a modified method on an expedited basis.

To: Elizabeth Dittman[Beth.Dittman@dhhs.nc.gov]; Pritchett, Jamie R[Jamie.Pritchett@dhhs.nc.gov]; Moore, Zack[zack.moore@dhhs.nc.gov]; Shehee, Mina[mina.shehee@dhhs.nc.gov]; Tilson, Betsey[Betsey.Tilson@dhhs.nc.gov]; sheila.holman@ncdenr.gov[sheila.holman@ncdenr.gov]; sandy.mort@ncdenr.gov[sandy.mort@ncdenr.gov]; linda.culpepper@ncdenr.gov[linda.culpepper@ncdenr.gov]; connie.brower@ncdenr.gov[connie.brower@ncdenr.gov]; bridget.flaherty@ncdenr.gov[bridget.flaherty@ncdenr.gov]
Cc: Jacobs, Brittany[jacobs.brittany@epa.gov]; Behl, Betsy[Behl.Betsy@epa.gov]
From: Strong, Jamie
Sent: Mon 8/27/2018 5:53:43 PM
Subject: DO NOT DISTRIBUTE-DRAFT EXTERNAL PEER REVIEW DOC GENX
GenX_External Peer Review_charge questions_06 21 18.pdf
DRAFT EXT PEER REVIEW Human Health Tox Values for GenX Chemicals_06-21-1....pdf

Attached are the charge questions and draft document for GenX toxicity values that were sent to external peer review FYI. Please do not distribute these documents or share the values.

Jamie

Jamie B. Strong | Chief, Human Health Risk Assessment Branch
Health and Ecological Criteria Division | Office of Science and Technology | Office of Water
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW, 4301-T, Washington, DC 20460
☎ Phone: (202) 566-0056 | strong.jamie@epa.gov

Organizer: Dittman, Elizabeth[Beth.Dittman@dhhs.nc.gov]

From: Dittman, Elizabeth

Location: Conference Line / Ex. 6 (passcode Personal Phone / Ex. 6

Importance: Normal

Subject: Follow up call with NC DHHS re: PFECAs and PFAS

Start Time: Tue 3/27/2018 7:00:00 PM

End Time: Tue 3/27/2018 8:00:00 PM

Required Attendees: Suzanne.fenton@nih.gov; Flowers, Lynn; Gloria.post@dep.nj.gov; Pritchett, Jamie R; Shehee, Mina; Moore, Zack; Mort, Sandra L; Henry, Audra E. (ATSDR/DCHI/WB); idz7@cdc.gov; Chou, Selene (ATSDR/DTHHS/ETB); Scinicariello, Franco (ATSDR/DTHHS/ETB); Benson, Amy; Lau, Chris; Strynar, Mark; Lindstrom, Andrew; Allenbach, Becky; Behl, Betsy; Patlewicz, Grace; Henry, Tala; Decker, John A. (CDC/ONDIEH/NCEH); Birnbaum, Linda (NIH/NIEHS) [E]; Blystone, Chad (NIH/NIEHS) [E]; Devito, Michael (NIH/NIEHS) [E]; bucher@niehs.nih.gov; Auerbach, Scott S (NIH/NIEHS) [E]; Maddaloni, Mark; Evangelista, Pat; Azzam, Nidal; Foster, Stiven; Crofton, Kevin; Sinks, Tom; Raffaele, Kathleen; Huff, Lisa; connie.brower@ncdenr.gov; Scott, Michael; Strong, Jamie

All –

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Thank you all for your time and expertise.

~Beth Dittman

Beth Dittman
Toxicologist and Public Health Assessor
Division of Public Health, Occupational and Environmental Epidemiology Branch
North Carolina Department of Health and Human Services
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5505 Six Forks Road
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Organizer:	Behl, Betsy[Behl.Betsy@epa.gov]
From:	Behl, Betsy
Location:	CALL IN: Conference Line / Ex. 6 CONF ID: Personal Phone / Ex. 6
Importance:	Normal
Subject:	discuss GenX project
Start Time:	Mon 3/26/2018 2:00:00 PM
End Time:	Mon 3/26/2018 3:00:00 PM
Required Attendees:	mina.shehee@dhhs.nc.gov; Elizabeth Dittman; Strong, Jamie; sandy.mort@ncdenr.gov; connie.brower@ncdenr.gov
Optional Attendees:	Gillespie, Andrew; Jacobs, Brittany; Miller, Gregory; Allenbach, Becky; Mitchell, Ken; Adams, Glenn; Pritchett, Jamie R

Organizer:	Behl, Betsy[Behl.Betsy@epa.gov]
From:	Behl, Betsy
Location:	CALL IN: Conference Line / Ex. 6 CONF ID: Personal Phone / Ex. 6
Importance:	Normal
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Start Time:	Mon 3/26/2018 2:00:00 PM
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ECOS FED PART GENX PFBS PRESENTATION 03 06 18.pptx

GENX BIBLIO 03 02 18.docx

Looking forward to our conversation on Monday. I have attached above the problem formulation for GenX and our bibliography that we shared with a state group identified by ECOS for us to coordinate with.

Best, Betsy

Organizer:	Risen, Amy J[Amy.Risen@dhhs.nc.gov]
From:	Risen, Amy J
Location:	12A: Conference Call
Importance:	Normal
Subject:	GenX Knowledge Gaps
Start Time:	Thur 7/6/2017 7:00:00 PM
End Time:	Thur 7/6/2017 8:00:00 PM
Required Attendees:	Mort, Sandra L; Elizabeth Dittman; Holt, Kennedy; Shehee, Mina; Langley, Rick; Audra Henry; Wheeler, John; Mitchell, Ken; Behl, Betsy; Strong, Jamie; Henry, Tala; Behrsing, Tracy; Benson, Amy; Aubee, Catherine; Kemker, Carol; Allenbach, Becky; Doa, Maria; Tina Forrester; Susan Moore; Selene Chou; Trent LeCoultre; idz7@cdc.gov; connie.brower@ncdenr.gov

Organizer:	Behl, Betsy[Behl.Betsy@epa.gov]
From:	Behl, Betsy
Location:	CALL IN: Conference Line / Ex. 6 CONF ID: Personal Phone / Ex. 6
Importance:	Normal
Subject:	discuss GenX project
Categories:	EZ Record - Private
Start Time:	Mon 3/26/2018 2:00:00 PM
End Time:	Mon 3/26/2018 3:00:00 PM
Required Attendees:	mina.shehee@dhhs.nc.gov; Beth.Dittman@dhhs.nc.gov; Strong, Jamie; sandy.mort@ncdenr.gov; connie.brower@ncdenr.gov
Optional Attendees:	Gillespie, Andrew; Jacobs, Brittany; Miller, Gregory; Allenbach, Becky; Mitchell, Ken; Adams, Glenn; Pritchett, Jamie R